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NEWSPAPER

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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CW Photo by A. Dooley

IBM's Mike McNulty makes his pitch on the exhibit floor of Info/Expo '76 in Las Vegas last week. Coverage of the conference, sponsored by the Data Processing Management Association, continues on Pages 2-7.

Software Developers Charged With Misapplication of Time

By Ronald A. Frank
Of the CW Staff

LAS VEGAS – Today's software developers spend too much time testing programs and not enough time designing them, Dr. Leon Presser, an independent consultant from Santa Barbara, Calif., told attendees at Info/Expo 76 here last week.

Because programmers spend most of their time in the testing phase, they generally believe it is best to hurry into this aspect of software development, Presser said.

Instead, they should expend more effort on the analysis and design of programs, he stated.

A typical software project has four stages: analysis, design, coding and testing. Only 5% of the time is usually spent on analysis while 50% is spent on testing. Design accounts for about 30% of the time while coding takes up 15%, he estimated.

But if something goes wrong with a program, the user winds up looking at the basic design of the software. In this sense, "there are no users today; we are all developers," he said.

In experiments with software development where more attention has been given to design, the results have been encouraging, Presser noted.

One test involved a Fortran program requiring 1,200 lines of code. Eighty-two percent of the time was spent on design

(Continued on Page 4)

Investigator for Insurers Indicted for Procuring Sensitive FBI, IRS Data

By Nancy French
Of the CW Staff

DENVER – Sensitive government data banks were allegedly tapped routinely by investigators for the 56 insurance companies indicted here last summer for invasions of individual privacy, impersonation and conspiracy [CW, June 28].

Factual Service Bureau, Inc., indicted and put out of business in this state but still operating elsewhere under the name Innerfacts, Inc., was charged with obtaining criminal records, tax returns and medical records for insurance companies for use in settling claims, former employees of the firm said.

Although the investigation is proceeding behind the closed doors of a grand jury hearing room, information not bearing on the cases that will be brought against the firms in this state has been released by court order, according to District Attorney Dale Tooley. The names of the insurance companies have not yet been made public.

Factual's employee training manuals told employees not only what information to go after, but also "how to" get it, according to a staff member for Rep. Barry Goldwater Jr. (R-Calif.), assigned to investigate the matter further.

In most cases, only a telephone call was necessary, he indicated.

Employees of the firm obtained criminal history information – even from the Federal Bureau of Investigation's (FBI) computerized criminal history system – in three ways:

- Posing as an officer from a neighboring police department that did not have access to the FBI system.
- Posing as a New York police officer at a Manhattan precinct and leaving a call-back number that was actually the number at Factual Service Bureau's Manhattan office.
- Hiring a private investigator who obtained the information from a friend at the Columbus, Neb. Police Department.

Nationwide Operation

Tooley emphasized the Chicago-based firm's illegal operation was not limited to Colorado, but was going on "all over the country," according to information turned up by his team of investigators.

"There was nothing criminal on the part of the police departments that gave out the information," he added. The individuals who answered the phone requests believed what the callers were telling them.

Furthermore, "when you have 40,000 arrests a year and thousands of small enforcement agencies contacting major police departments for information like this every day, it is impossible to keep records," Tooley said.

"The only records are between the investigator and his customer" – the insurance company, he said.

Tax returns were obtained from the

(Continued on Page 4)

Second Processor, More Memory Added to Upgrade IBM 370/158

By Esther Surden
Of the CW Staff

WHITE PLAINS, N.Y. – IBM announced enhancements to the 370/158 last week to boost its performance and increase its memory.

A second instruction processor has been added to the 158 to provide 1.5 to 1.8 times the internal performance of a 158 with one instruction processor, IBM said.

In addition, the 158's maximum main memory has been expanded to accommodate 6M characters compared with the 4M characters previously available.

The Model 158 Attached Processor System (APS) is similar to a configuration announced for the 370/168 in February [CW, Feb. 23]. The APS was designed to add the instruction execution elements of a second 158 to the user's system "to provide an alternative growth option to a complete multiprocessing system," a company spokesman said.

In the APS system, a second instruction processor, the IBM 3052 attached processing unit, is linked to the host CPU. All main memory and I/O capability is provided by the host processor but shared with the second instruction processor in a tightly coupled attached processing mode, the spokesman said.

The second instruction processor features a high-speed 16K buffer, he added.

Current 158 users with either the 158 or the 158-3 CPU can upgrade to the APS configuration in the field at a minimum additional monthly rental price of $14,935 and a minimum purchase price of $452,500, IBM said.

The upgrade includes enhancements to the CPU that synchronize timing between the host CPU and the attached processor unit. It also includes functions that allow the second instruction processor to access the CPU's main memory and some other hard-wired changes, IBM said.

Besides the additional instruction proc-

(Continued on Page 4)

Unlike Tennessee

N.Y. Taxing Software, Services

By Molly Upton
Of the CW Staff

NEW YORK – In moves that may affect users and vendors alike, New York State is mounting a campaign to tax both software and DP services under a set of wide-reaching regulations effective Sept. 1, 1976.

The laws themselves have not changed; what has changed is the state Department of Taxation and Finance's interpretation of what is taxable under the laws.

One company – Computer Task Group, Inc. (CTG) of Buffalo – has been asked by the Department of Taxation and Finance to pay taxes which the state claims the firm should have collected in the past from its customers (see related story on Page 42).

CTG interpreted the state's action as an attempt to collect taxes on software retroactively. But Paul Greenberg, secretary to the state tax commission, denied any effort on the part of the state to retroactively collect taxes on software – something that previously was entirely exempt from taxation.

No Retroactive Collection

The new regulations were part of a task force effort to codify the state's 11-year-old sales and use taxes, Greenberg said. In studying the laws, legal experts with the task force decided the previous interpretation that software was not taxable was legally incorrect.

"But if we tried to collect retroactively, we'd probably put the computer software business out of business in the State of New York," he said. Furthermore, "it wouldn't be legal and it just wouldn't be fair."

Most contracts between a DP vendor and a user specify the user is responsible

(Continued on Page 3)

Privacy Law Needed, EFT Commission Told

By Toni Wiseman
Of the CW Staff

WASHINGTON, D.C. – Unless Congress enacts a new national law to protect individuals whose personal records will be transferred electronically, individuals will have no way of defending themselves against violations of their personal privacy, according to Alan F. Westin, professor of public law and government at Columbia University.

Testifying before the National Commission on Electronic Fund Transfers (EFT) here last week, Westin said "the age of clean air and water as 'free goods' is over and so ought to be the age of free commercial use of our personal profiles."

Westin was one of many witnesses asked to address how EFT information, which could reflect a consumer's habits, travel and political and religious persuasions, should be protected against negligent or intentional misuse.

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As Grosch Tells It

DP Fairy Tale Has Three Dwarfs Left

By Ann Dooley
Of the CW Staff

LAS VEGAS – Once upon a time there lived Snow White and seven dwarfs, but those days are gone now, according to Dr. Herbert R.J. Grosch, president of the Association for Computing Machinery.

Grosch's version of the story had only three dwarfs – Burroughs Corp., Univac Corp. and Digital Equipment Corp. – left, and Snow White – or IBM – had turned into a "Grim Gray Giant."

"Burroughs is the secret dwarf that makes a great product, but the trick is to get it," Grosch told a luncheon gathering at Info/Expo '76 here last week.

"DEC is the IBM of the minis and is now a large dwarf. 'National Point-of-Sale' – NCR – and Control Data Corp. are no longer attached to Snow White. And Honeywell is having a garage sale," he continued.

The industry is changing and growing rapidly from both ends of the spectrum. The minicomputer and microcomputer business is expanding economically and technically at a much faster rate than the middle ground, according to Grosch.

"These markets will reach their limits eventually, but it's way down the road," he said.

In forecasting the future of the industry, Grosch told attendees "your business can't wait for technology to slow down so you can climb aboard, because it ain't going to do it."

Grosch forecast further DP corporate deaths, such as Singer's, both in the U.S. and abroad. He did not give much hope for the stability of Siemens, Inc. and said Britain's International Computers Ltd. (ICL) is supported by a government which cannot even support itself.

"I am convinced that Japan is not losing ground in relation to the U.S. and that there is not a very big gap between the two," Grosch said.

The Japanese "could be competition to U.S. suppliers, but in order to do that they must do research and development now," he said.

They must maximize their untapped resources, such as women, in their research and management positions, Grosch said.

If all of these companies can remain alive and well, it might be possible to have a 50-50 split between them and IBM, he said.

"I hope the dwarfs don't line up behind IBM and follow [its] lead. If IBM comes out with some revolutionary development, they will be left completely behind," Grosch said.

"I think the biggest single element in the industry's future is IBM's decision to do something radical. If [it does], we're in serious trouble; if not, competition is possible."

CW at Info/Expo '76

Claims of Trade Secret Thefts Severed From Calcomp vs. IBM

By E. Drake Lundell Jr.
Of the CW Staff

LOS ANGELES – California Computer Products, Inc. (Calcomp) vs. IBM starting here next week [CW, Oct. 4] will be a pure antitrust trial without side issues such as theft of trade secrets, according to a ruling here recently.

Judge Ray McNichols severed IBM's counterclaim against Calcomp on the trade secret issue from the antitrust trial in a pretrial hearing, leaving only Calcomp's antitrust claims to be tried.

Both sides are now preparing for a jury trial of that issue.

The judge apparently felt adding the trade secret issue would prolong the trial and make it too complicated. While the antitrust case involves 1,100 documents and a relatively few number of witnesses, he noted, IBM had planned to use 11,000 documents and 129 witnesses on the theft of trade secrets claim.

The trade secrets issue will be held for a later trial.

At the same pretrial conference the judge rejected an IBM motion calling for a summary judgment in the antitrust case that would have found the firm not guilty of violations alleged by Calcomp.

In addition, he said Calcomp could bring up IBM actions in the systems marketplace as part of its case against IBM, but indicated he would give those actions less weight than the claims of illegal actions on the part of IBM in the peripherals marketplace.

Furthermore, McNichols deferred a Calcomp claim for $60 million in damages from IBM because of Calcomp dealings with BASF. He said those damages should be part of the international antitrust case Calcomp plans to bring against IBM in the future and not part of the domestic action.

McNichols also scratched a Calcomp claim for $10 million it said it had to pay in excessive interest charges because of IBM's alleged monopolization.

This leaves the Calcomp claims against IBM at about $100 million.

Since the judge has allowed Calcomp to include alleged IBM antitrust violations in the systems area in the trial, Calcomp will basically be presenting a capsule version of the U.S. government's case against IBM that is continuing to drag on in New York, observers said.

Correction

"Congressman Warns OTP Head Against Influencing AT&T Suit" [CW, Oct. 11] may have given the impression the White House Office of Telecommunications Policy (OTP) had taken a position opposing the government's antitrust suit against AT&T. In fact, OTP Director Thomas Houser said OTP has taken no position on the litigation.

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Control of Data Lies in Access: Lecht

By Catherine Arnst
Of the CW Staff

LAS VEGAS – The intent of privacy legislation should be to control the information being accessed, not the acquisition of that information, according to Charles P. Lecht, president of Advanced Computer Techniques Corp.

Lecht described the privacy issue to attendees at Info/Expo '76 held here last week as being part of a larger issue: centralization vs. decentralization.

"Centralization was an enormous issue in the '60s," he said, and privacy is "another manifestation of that issue."

Privacy, however, is an abstract issue to most Americans, he added, predicting only .5% of his audience had ever been affected by an invasion of privacy. Compared to the rest of the world, "personal freedom is still the best in the U.S.," he remarked.

CW at Info/Expo '76

A way must be found to make laws for everyone to obey that still protect individual privacy, and this is the paradox within the privacy issue, he noted.

Questions must be asked such as who will pay for privacy legislation and "how much do we need" before any laws can be passed, he insisted. The laws that are passed should not necessarily limit how much information is collected, but rather how much is given out and to whom, he added.

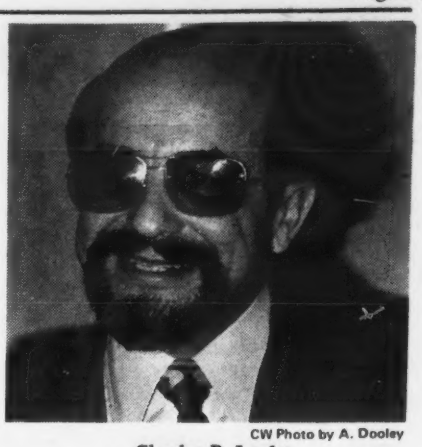
Balance Sought

Lecht seemed confident that, in America, a balance would be found between the right to privacy and the protection of business interests which would result in only a minimum of harm. The growth of business "is the American way" and should be protected as much as possible, he said.

One suggestion he made to ensure privacy legislation does not go overboard in protecting private citizens was directed toward the Data Processing Management Association (DPMA).

DPMA's privacy committee should act as a clearinghouse for any privacy abuses that may occur so the extent of the problem can be properly judged, he said.

Such action "would save a lot of wasted time" because it could help prevent legislation from being enacted that would be unnecessary and overly burdensome for American business, he said.



CW Photo by A. Dooley
Charles P. Lecht

N.Y. Taxing Software, Services

(Continued from Page 1)

for any taxes. However, it is the vendor's responsibility to collect these taxes, a vendor said.

While the Tennessee Supreme Court decided software is not tangible property and is therefore not taxable [CW, Aug. 30], this decision is not necessarily a precedent for other states unless they choose to make it so.

The New York State regulations specify software is tangible personal property and is thus subject to sales taxes. Keypunching and related activities are also taxable whether the customer or the service firm provides the media.

Contract programming, too, is taxable because it is a "service to tangible personal property" even if work is delivered to the customer on coding sheets to avoid the keypunch tax, according to a memo written by Francis Person, chief of the Instructions and Interpretations Unit of the Department of Taxation and Finance.

Information services are subject to New York State tax except when the "output is personal or individual in nature to the recipient and the DP company cannot or may not incorporate a substantial portion of the same information in reports which it furnishes to other clients," Person said.

"The processing of data may be completed with a 'canned' program owned by the processing company or the program can be furnished by the customer," he said.

Examples of exempt information services are accounting reports, accounts receivable and payable, sales analyses, inventories, payrolls and tax reports.

In addition, programming services to modify or update an existing program in order to meet new or additional processing procedures employed by the owner of the computer program are regarded as a service to tangible personal property and is subject to taxation, Person said.

But, despite Person's clarifications, the regulations vary regarding the sale of time.

For instance, in Example 8 of tax law 1101(b)(5), "A corporation contracts with a computer center to use the computer on the center's premises for 10 hours weekly. The corporation provides its own operation and its own materials. During the 10-hour period, no one else may use the machine. This constitutes a transfer of possession, pursuant to a rental, lease or license to use, which is a sale subject to tax."

In Example 9, "Same facts as in Example 8, except that the computer center provides and directs the operator. In this case, there is no transfer of possession to the corporation, as it has no control over the operation of the computer."

In Example 10, "Same facts as in Example 8, however, instead of [customers] sending an operator to the computer center, they have a terminal in their office which is connected to the computer center by telephone. This is a transfer of possession which is subject to tax," according to the regulations.

The latter example covers time-sharing services, a member of the task force said.

The LIBRARIAN® and MetaCOBOL® from ADR Boost Efficiency at Computer Power, Inc.

Computer Power, Inc., Jacksonville, Florida, provides complete data processing services for a number of banks, mortgage bankers and saving and loans whose mortgage portfolios have over 1,250,000 mortgage loans valued at over 24 billion dollars.

Over 8,400 program modules are now used to provide client services—modules which require storage space equivalent to 2.7 million card images.

Until The LIBRARIAN was installed, program storage and management was an expensive and time consuming problem

According to Technical Support Manager Roy Fileger, "Before we installed The LIBRARIAN, we stored everything on 17 IBM model 2314 disk packs. That meant we had 17 different source statement libraries. We were making 1000 pack changes a month and we were spending over 50 hours of computer time each month reorganizing files."

"Program standardization was a problem too. Programmers would make changes to one pack and not duplicate the changes on the other packs."

The LIBRARIAN enabled Computer Power, Inc., to cut disk storage by 94%.

After The LIBRARIAN was installed 2 years ago the entire source statement library was immediately compressed with the result that Computer Power, Inc., using the IBM 3330 disk system, now stores all of its 8400 program modules on a single disk, constantly on-line. The benefits were far greater than just the savings in disk use, however. Time required for file reallocation was virtually eliminated. Elimination of disk shutdowns and disk changes added another 50 hours a month of usable computer time. And standardization rapidly improved because common program changes no longer had to be duplicated on many different disks.

"We really have file backup now. And that's tremendous."

Roy Fileger remembers, "When we had 17 packs our backup and savings procedures were extremely time consuming. Now, with The LIBRARIAN and only one disk pack, we are able to save everything every single day in just 20 minutes."

ADR's MetaCOBOL is doing more than just conversion.

Computer Power, Inc., is in the final phases of conversion of more than 6000 program modules from DOS to OS/ANS. According to Roy Fileger, "We're running through MetaCOBOL and coming out with state-of-the-art programs, OS/ANS, single entry, single exit with I/O completely changed. All the programs we have converted so far have executed perfectly the first time."

Programs are being standardized as they go through MetaCOBOL.

"Everything coming out is looking alike. MetaCOBOL is picking up errors in violation of COBOL specifications that the compilers would let go through. As a result, our programs are really coming out clean," he continued.

"As far as I know, there is no alternative to MetaCOBOL."

"Any other system would have required handmade changes involving a staggering amount of time," Roy Fileger added.

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Software Developers Charged With Misapplying Testing Time

(Continued from Page 1)

with 14% spent on coding and only 4% devoted to testing.

The project was completed in 61 hours, which means it was coded at a rate of about 20 lines per hour. The increased time spent on design resulted in a greatly reduced testing phase, he said.

Although this test program was relatively small, similar experiments with larger software projects have indicated the same type of benefits can be expected, Presser said.

In support of this concept, Presser contended "design creates order while maintenance [testing] creates disorder."

Projections in the growth of the computer industry indicate programmers become more scarce as the number of installed CPUs increases, he said.

In 1955, there were about 1,000 mainframes with 10,000 programmers. By 1985, there will be one million processors installed with 330,000 programmers.

This means the ratio of programmers to CPUs is dropping from 10:1 in 1955 to .7:1 today and to a projected .3:1 in 1985, Presser said.

CW at Info/Expo'76

"If you have a good programmer today, hang on to him or her," he advised.

Productivity Problem

The expected shortage of good programmers will be aggravated by the fact the university system is not geared to help produce good programmers, Presser said.

This year, the average programmer is producing about 1,100 lines of code per year while in 1985 it is projected a programmer will produce 1,500 lines of code per year.

Ways must be found to make these people more productive, Presser said, adding the reduction of time spent on testing would free more programming time for coding.

At the same time that productivity of programmers remains low, the relative percentage of DP dollars spent on software is increasing, he said. In 1955, 55% of systems costs were spent on software, today it is about 70% and, by 1985, it is estimated 85% of the costs of a system will be spent on software, he pointed out.

"When 85% of every computing dollar is spent on software, ways must be found to make it more efficient," he said.

Today's software problems are tied to the limited number of programmers, low productivity and poor quality of the programming effort, he said.

"There is very little discipline in software today," he added.

Next Generation Coming Soon

LAS VEGAS – The fifth generation of software, marked by integrated tools, data analyzers, documentation aids and methodology enforcers, will begin in the late '70s, Dr. Leon Presser, an independent consultant, told attendees at Info/Expo '76 here last week.

It will supplant fourth generation software, which began only about five years ago, with the first data base support systems, interactive programming and documentation aids, Presser predicted.

The development of translator writing systems and structured preprocessors will bring this period to a close, he said.

Outlining the development of software from the early '50s when Univac I was announced, at that time software was characterized by assemblers and subroutine libraries, Presser said.

In the late '50s, the second generation began with the advent of Fortran I as a higher level language. This period also saw the start of leaders, linkers, editors and debugging aids, and software utility packages emerged, he recalled.

The third generation of software development began in the early '60s with the advent of operating systems and carried over into the middle of the decade with new, higher level languages and time-sharing conversion aids, he said.

Performance monitors were developed during the late '60s along with application-oriented software aids.

IBM Enhances 370/158 System

(Continued from Page 1)

essor, the current 158 user upgrading to the APS would need to obtain a remote system console primarily for diagnostics and an attachment feature which provides storage protect capabilities, the spokesman said.

A 4M-character APS without I/O equipment except for the necessary processor attachment costs $75,065/mo. The previous upgrade path, a multiprocessor configuration with 4M characters of storage shared between two processors, costs $102,630/mo.

The IBM spokesman pointed out this comparison does not take into consideration the software performance or increased number of channels available on the multiprocessor configuration.

The 158 APS is supported in multiprocessing mode by OS/VS2 MVS, IBM said. In addition, IBM announced VM/370 support for both the 158 APS and 168 APS to allow concurrent execution of tasks within the two instruction processors.

Extended Memory

The larger main memory capacity announced for the 158 "will enable users to keep more information available for processing at any given time," IBM said. Memory can be added in 1M-character increments to allow either 5M characters or 6M characters to be accommodated.

The maximum main memory capacity for multiprocessor configurations remains 8M characters, the spokesman noted, and it is possible for some users to have asymmetrical configurations.

The additional memory can also be installed in the field, he said, adding field engineers can make the upgrade by adding memory boards and changing some hard-wired addressing functions.

The larger memory for the 158 will be available in the second quarter of 1977, IBM said. Monthly rental for the 158-3 CPU with 5M characters is $70,010; it can be purchased for $2,794,100. The 158-3 with 6M characters costs $75,910/mo or $2,964,100.

Current 158-3 users can have the memory upgrade for $5,900/mo per million characters. The upgrade may be purchased for $170,000.

Time for Upgrade

It takes about 40 system hours to upgrade to the APS, a spokesman said. About 16 of those hours are needed to upgrade the CPU to accommodate the second processor and 24 are reserved for the actual addition of equipment and debugging.

The work can be done on two separate weekends, IBM said.

The APS and field upgrades will be available in the summer of 1977, IBM said. Monthly rental for the APS system will range from $52,965 with 512K characters of main memory to $91,205 with 6M characters of memory.

The systems can be purchased for $2,300,100 to $3,427,400, IBM said.

Insurance Investigators Indicted

(Continued from Page 1)

Internal Revenue Service (IRS) in a similar manner, the Goldwater aide said, noting the training booklet cited a "confidential source" in the IRS office in Kansas City.

Factual employees were instructed to obtain "line by line" details from individuals' tax returns, he said, adding information on Social Security payments was also obtained.

The FBI refused to comment on the ease with which Factual employees were able to sidetrack the FBI's security system.

An IRS spokesman said it was "highly unlikely" personal taxpayer information was obtained from the IRS in view of the penalties dictated by the Privacy Act.

"If it did happen, we would have no way of knowing it," he noted.

The IRS is aware of the allegations, however, and an internal investigation has been initiated, he added.

Goldwater's staffer expressed concern over the position of the insurance companies in this matter, especially in view of all the fraudulent claims filed against them.

"We feel that's the reason a lot of these companies have been going after this data," he said.

The investigation began in September 1975 and Tooley took the problem to the grand jury a month later.

Last June, the grand jury obtained a court order to release certain exhibits and transcripts to the Privacy Protection Study Commission in Los Angeles.

Navy Locates Jet Fighter

WASHINGTON, D.C. – The U.S. Navy has found the F-14 Tomcat jet fighter which plunged into the Atlantic Ocean 75 miles west of the coast of Scotland in mid-September.

The Navy had stepped up the search in past weeks for the $14.3 million top-secret aircraft equipped with advanced computer and electronic navigation weapon systems by sending three ships to the site, according to a spokeswoman at the Naval Air Systems Command.

The plane was found under about 1,900 feet of water, sources said. It sank after it missed the catapault of the aircraft carrier John F. Kennedy and hit the water beyond the flight deck [CW, Sept. 27].

The Navy will not comment on the possibility a malfunctioning computer system caused one of the F-14's two engines to race out of control until it has examined the plane, she said.

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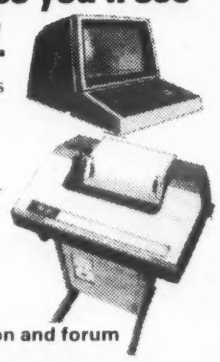

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MRI Shows DOS/VS System 2000

TCI, IBM Terminals Among Debuts Made at Exhibit

By Ronald A. Frank
Of the CW Staff

LAS VEGAS – More than 40 exhibitors displayed products and services at Info/Expo '76, the 25th annual conference of the Data Processing Management Association (DPMA) here last week.

Terminal Communications, Inc. (TCI) of Raleigh, N.C., introduced an intelligent programmable terminal system with a dual microprocessor controller, up to 1M byte of floppy diskette storage and as many as three CRT terminals.

Called the Remote Access Communications Terminal (React), the system can operate in binary synchronous communications mode, Teletype mode and other modes to transmit data in an existing network, TCI said.

A typical React configuration including 16K of memory, 250K of diskette storage, keyboard CRT and printer costs $12,900 or $400/mo on a two-year lease. Maintenance costs $85/mo, a spokesman said.

TCI also introduced several enhancements to earlier terminals including a Synchronous Data Link Control (SDLC) capability for the TC 241 keyboard printer, TC 271 control unit and TC 275 keyboard CRT.

The feature for the TC 271 provides capabilities similar to the IBM 3271 and costs $1,000 or $50/mo with maintenance. The TC 275 feature is similar to the IBM 3275 and costs $575 or $40/mo with maintenance, and the TC 241 feature, similar to the IBM 2740 and 3767, is priced at $800 or $30/mo with maintenance.

The SDLC capabilities are field-installable on existing TCI terminals and will be available in April, except for the TC 275 feature, which is scheduled for June, the firm said.

MRI Systems Corp. showed a DOS/VS version of its System 2000 data base management system. Designed for DOS users of smaller systems such as the IBM 370/135, the software is said to run in 40K bytes of storage.

CW at Info/Expo '76

The basic system will include such options as a query/update language, host interfaces to Cobol, Fortran and PL/I, multiuser multithread capabilities, an integrated report writer and an interface for IBM's CICS.

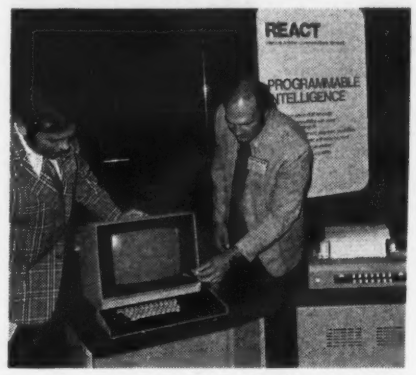
The basic software for DOS/VS users costs $30,000 and will be available next month, a spokesman said.

IBM demonstrated a 120 char./sec version of its 3767 terminal at the show. The Model 3770 was shown in both dial-up and private-line versions receiving data from an IBM 370/168 at the IBM Data Center in Los Angeles.

The 168 operated under MVS/TSO and included a 3705 running with Release 4.1 of the Network Control Program, an IBM spokesman said.

The IBM 3770 was also demonstrated in a stand-alone configuration using an order entry program loaded into diskette storage on the system.

About 2,000 users attended the three-day conference. The 1977 Info/Expo conference has been scheduled for Oct. 9-12 in Washington, D.C.



CW Photo by A. Dooley

Frank S. Figearo (left) and Richard D. Balfour took a look at the CTI React system when they visited the Info/Expo exhibit floor last week.

Awad Sees Phaseout Of Programmers Now

By a CW Staff Writer

LAS VEGAS – In-house programmers are being phased out in favor of systems analysts with a strong background in one or more programming languages, according to Dr. Elias M. Awad of Ball State University.

Awad's research has shown a decreasing emphasis on in-house programming because of the increased availability and "popular use" of software packages and preprogrammed, ready-to-use applications packages from both mainframe vendors and independent software houses, he told an Info/Expo '76 session here last week on job satisfaction in the DP environment.

Major applications such as payroll, accounts receivable and payable and inventory control with updates routines are now economically available. This leaves in-house programmers working primarily with "special-purpose, one-shot applications and systems maintenance routines," Awad said.

High Turnover Rate

Awad's findings were based on a study of 50 programmers and 36 systems analysts in the DP department of a large petroleum company. In many cases, those hired as programmers were expected to advance into systems analysis within six to eight months, he said.

The average firm experiences a 30% to 40% turnover in DP personnel because of voluntary resignations each year, Awad noted. Lack of internal opportunities for promotion, involvement with routine tasks, limited participation in task-related decisions and inadequate fringe benefits were the main reasons for this turnover.

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Privacy Law Called Necessary To Cover Records Used in EFT

(Continued from Page 1)

The witnesses were also asked to assess the legitimate uses of EFT information by the government.

The issue at present is one of "transition," or how American society should approach changing from existing financial payment systems to more automated systems, Westin told the commission.

This is necessary since there is no official EFT plan to assess, although society is undeniably moving toward various "less-check" and "less-cash" arrangements, he noted.

Disagreeing with those who propose a simple extension of current confidentiality policies by financial institutions, credit card firms, retail establishments and commercial reporting agencies, Westin said when, as in EFT, personal information is merged from a variety of present sources to create and maintain a permanent financial transaction data base and network, a new trustee relationship has been created between the system's managers and the individual account holder.

"Under this conception, the data-rich profile of an individual residing in the EFT data base would be a valuable legal property belonging only to the individual account holder and not to the system," Westin said.

The system managers should be allowed to use the information solely for purposes of funds transfer and its necessary monitoring for security, audit and other protective purposes, according to Westin.

"However, any commercial or other gainful use of an individual's transactional history represents the taking of a valuable property right for which both compensation and consent are required," he said.

In cases of government access, Westin proposed any law enforcement inquiry involving inspection of EFT records directly related to First Amendment-protected activity (religion, speech, assembly and, especially, records of private associations) would be presumptively improper.

Charles C. Marson, legal director for the American Civil Liberties Union Foundation of Northern California, said both the Supreme Court's upholding of the Bank Secrecy Act and the California Right to Financial Privacy Act, which will go into effect Jan. 1, are directly applicable, in theory, to records of EFT transactions.

The federal law is based on the notion that the holder of the records, rather than the subject of the records, owns them and, therefore, the subject has no constitutional right to assert, according to Marson.

"The California rule, both by statute and decision, follows the premise that the privacy interest belongs to the customer, not the record custodian, and the customer must therefore receive notice of attempted access to those records and have a fair opportunity to resist it," he said.

However, EFT records will contain far more information than does a record on a check drawn on a bank, he noted.

EFT records will provide information almost instantaneously, while substantial time may pass before bank records will yield desired information.

Further, data generated by EFT may be much more readable and, therefore, more accessible than records such as bank checks, he added.

Marson also supported statutory protection of EFT data.

Not Unduly Concerned

Carol S. Greenwald, commissioner of banks for the Commonwealth of Massachusetts, was not unduly concerned over privacy issues.

If information in an EFT system is accessible only by using a plastic card or personal identification number (PIN) known only to the individual, privacy would not seem to be compromised because the individual's bank doesn't need to know the PIN after the card is issued, Greenwald said.

"Under such an arrangement, a merchant desiring data could request it electronically, but only with the customer's card or only if the customer punched in the appropriate code.

However, Greenwald did agree with earlier witnesses that an EFT system will make it possible to collect and store data about any individual's or company's behavior, vis-a-vis financial transactions, more easily than ever before.

Diametrically opposed to Westin, Barry I. Deutsch, vice-president and director of marketing for Provident National Bank in Philadelphia, stated "consumer concern over privacy is often misinterpreted by researchers and consumer advocates."

Privacy is a marketing problem, not a regulatory one, he said. "Moreover, it is a problem for a certain segment of the public that will never be resolved, thus mandating the continuation of the paper-based payment system," he added.

Deutsch based his arguments on a study which showed consumers were adverse to direct payroll deposit because it removed their control or because they like to deposit payroll checks themselves.

There was no mention of privacy concerns, he said.

Privacy Hearings Extended

WASHINGTON, D.C. – The Privacy Protection Study Commission will hold two additional days of hearings on the recordkeeping practices of educational institutions on Nov. 11-12 here.

The hearings will be held in Room 2358 of the Rayburn House Office Building on Independence Ave. S.W. from 9:30 a.m. to 5 p.m. on Nov. 11 and from 9 a.m. to 5 p.m. on Nov. 12.

The commission will focus on the practices of postsecondary institutions, organizations maintaining personal records related to school admissions or financial aid, the Department of Health, Education and Welfare resources and strategies for implementing the Family Educational Rights and Privacy Act (Ferpa) of 1974 and the development of statewide or regional computer-based information systems for auditing, eligibility determination or provision of special services in schools.

Additional information on the hearings is available from Carole Parsons, executive director of the commission at 2120 L St. N.W., Washington, D.C. 20506.

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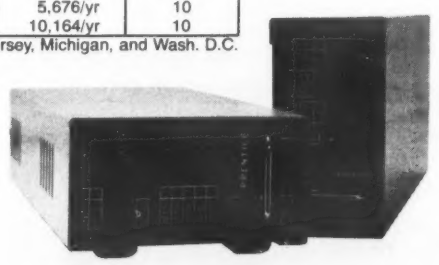

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Senate's Productivity Growing With DP Applications

By Ronald A. Frank
Of the CW Staff

LAS VEGAS – The U.S. Senate is well on its way to making its work more productive through the use of computerized applications, according to Sen. Howard Cannon (D-Nev.).

Delivering the keynote address at the opening session of Info/Expo '76 sponsored by the Data Processing Management Association (DPMA), Cannon said the Senate has several applications already operating.

The Senate Post Office, which receives about one million letters per month, uses "prearranged text-specific answer" letters to constituents to reply to correspondence sent to members of the Senate.

A computer is used to compose "prepersonalized letters" using position papers presented by a senator on a specific issue, Cannon said.

These computerized letters will later be followed up when a vote is taken on the issue so constituents can be kept informed of progress being made.

Cannon, chairman of the Senate Sub-committee on Computer Services, said the computer has also been used to develop a data base of pending legislation.

CW at Info/Expo '76

In 1976, 1,500 measures were introduced into the Senate and more than 10 times that number were introduced into the House. About 250 of these proposed bills were passed; the rest were referred to a committee or subcommittee.

The Senate has 32 standing committees and 140 subcommittees and the data base is being developed so senators and staff members can track the progress of specific legislation through the legislative process, Cannon said.

Information in the data base will be called up on terminals and all the information reported during the day "will be available and fully processed in the data base the next morning," he said.

The subcommittee is also developing a computerized model of Senate committee assignments to see if any changes should be made, Cannon said. At present, the 100 senators have an average of 20 committee assignments, which often makes it difficult for a member to be everywhere he should be.

The Senate is "a very sensitive organization" and its procedures have been built up slowly so care will have to be taken to ensure the computer "does not run away with our processes" and do things that go against reason and careful judgment, Cannon told attendees.

Badly Planned Privacy Proposals Should Be Fought, Lawyers Say

By Catherine Arnst
Of the CW Staff

LAS VEGAS – No one in his right mind would oppose privacy legislation; what should be opposed is poorly planned and enacted legislation, a panel at Info/Expo '76 here last week agreed.

"Bills are going down the tubes because of poor planning," John C. Lautsch complained. Lautsch is counsel for the California State University and Colleges.

"Legislation is supposed to be a solution to what is perceived as the privacy problem," William A. Fenwick added. The partner in Davis, Stafford, Kellman and Fenwick said, however, there also must be protection from overzealous privacy proponents.

The government needs to share data in order to work and a lot of good can come out of the massive amount of what may seem like unnecessary data collected by such agencies as the Census Bureau, Fenwick said.

However, the government can also destroy a person by selectively reporting that same information, he warned. The country became aware of this potential threat after Watergate, when the social issue of "what should be done about the collection of private information" became a major national concern, Fenwick said.

One result of this concern has been a plethora of privacy legislation; in 1975, 39 states had such proposals covering both public and private sectors, he said.

The federal Privacy Protection Study Commission is studying the problem, but the commission's charter is so broad "it can't possibly carry out its mission," Fenwick said.

"To a world enamored of computing, everything has come to look like a DP system" and people are viewed as only one more type of information-processing system in the name of privacy, he said.

Lautsch warned that organizations cannot be treated as nothing more than information-processing systems. Legislation must take into account that not all organizations are homogeneous, and provisions must be flexible enough to provide for a variety of administrative and organizational formats, he said.

Legislation also cannot apply the same procedures to a multipurpose organization, such as a university, and a single-purpose one, such as a motor vehicles department, he cautioned.

The largest problem with privacy legislation proposed to date, however, is the imprecise and broad language which makes it next to impossible to comply with the regulations, Lautsch said. This is partially attributable to a lack of thorough understanding of what is needed, he added.

Purdue University is offering a possible solution to that lack of understanding with a newly created Privacy Information Research Center.

Two projects already undertaken by the center include a cost model related to privacy legislation and a study of societal attitudes toward privacy, particularly white-collar attitudes toward corporate recordkeeping, according to its director, Jack Osborn.

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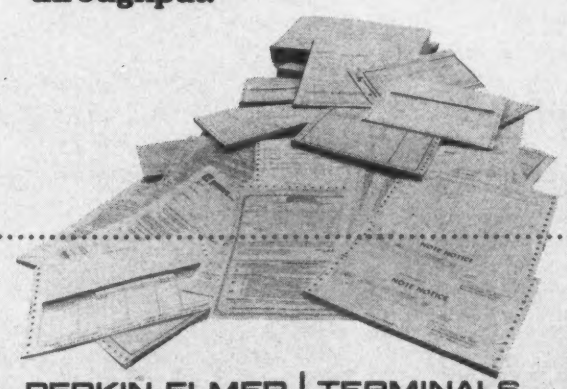

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Bulging Wallets Seen From Split in Encoding Practices

By Edward J. Bride
Of the CW Staff

HOUSTON – The divergence of encoding standards for credit/debit cards in the retailing and banking fields may prevent the consumer from ever reducing the number of cards needed for credit transactions, according to a representative of Sears, Roebuck & Co., one of the nation's largest retail outfits.

"There is no communication between the two segments" of the credit industry, Randolph Lively noted during a panel discussion held at the annual conference of the Association for Computing Machinery (ACM) here recently.

Financial institutions want their debit cards to have a magnetic stripe, but the point-of-sale (POS) scanning equipment which Sears and other retailers have adopted relies on optical codes, either human-readable (for most retail systems) or bar-coded (in grocery stores), Lively noted.

"The POS scanner is cheap," he said, adding the product tags are "cheap to encode" and also secure.

Lively also contended "consumers will like [electronic funds transfer (EFT)] once they understand it," and after the proper job has been done in security and privacy. This accomplishment is "some years off," he added.

Responding to a question from the floor on whether Sears would accept magnetic stripe cards, Lively said, "I doubt seriously" that this would happen because of Sears' investment in scanning equipment.

Part of the security/privacy problem stems from the fact that there are "no standards for the personal service of programming," according to Bob Abbott of the DP Audit Division of Tymshare.

Abbott, who formerly administered a research project in secure operating systems at Lawrence Livermore Laboratories, said "program proving is far away" and programs should be examined from the more troublesome perspective of "what a system can be made to do, rather than what it was intended to do."

CW at ACM

Roland Eppley, president of the Eastern States Bankcard Association, added "EFT is a technology looking for a market.

"Which comes first, the technology or the demand?" he asked. It is difficult to ask people if they would like something they never had before, he said.

To further complicate this matter, Eppley noted "every study we have ever done on EFT shows there is no profit." Companies, banks and retailers are contemplating EFT now as a defense against losing customers, he explained.

Eppley predicted an insufficient expansion of this market, with concomitant shifts in market shares by banks. There will be downward pressure on interest rates and profitability, he added.

"Perhaps 5,000 of the 15,000 commercial banks will disappear" over the next five to 10 years, he said.

Banks are now reappraising their interest in "retail banking" and its return on investment, he said.

Users Faulted On DP Selection

By a CW Staff Writer

HOUSTON – One reason computer users don't get what they want from their computer room is that they don't know what's going on outside it.

That was one conclusion reached at a technical session on the selection and evaluation of computer systems and services, during the recent national conference of the Association for Computing Machinery (ACM) here.

This lack of knowledge includes activity on terminals, the unpredictability of the work of programmers and shortcomings in the discipline of benchmarking, panelists contended.

There is a tendency, for example, to use the process of "mathematical induction" in planning for terminal networks, according to James Cameron of Denison University.

"We say if something works with six terminals, it will work for seven, and if it works for seven, it will work for 100." This is faulty reasoning, Cameron explained.

Furthermore, most users don't know what is going on at the terminals, he said, using the percentage of time on program checkout vs. productive work as an example. This leads to trouble writing system specifications, he noted.

"There is a 100% probability you will not get what you want" when this situation exists, he continued. "You'll pay more than necessary, which is a minor detail, but you will not get what you want."

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Small Businesses 'Scared Off'

People, Politics Called Dampers on Spread of Minis

By E. Drake Lundell Jr.
Of the CW Staff

HOUSTON – People and politics will be the limiting factors in the spread of minicomputers into smaller companies and organizations, according to panelists at the recent national conference of the Association for Computing Machinery (ACM) here.

"Who is going to do" the systems and programming work for the smaller companies? Prof. Ted Cary of Wichita State University asked.

"I don't see any students being trained to help the small businessman," he added, claiming a "good portion" of the people already in this area are "basically frauds."

Many small businesses were basically happy with "well-thought-out and well-honed" manual systems and turned to computers only when they grew to the extent they felt the firm was getting out of their control, he said.

CW At ACM

The cost of planning and implementing such systems was "often misunderstood and underbid," he said, but added the small business world would not be "scared off" from computerization if told the true price from the beginning of a project.

Another panelist, D.E. Schilling of Arbat Systems Ltd., said many of the smaller organizations are put off by the mystique of computing and the jargon that goes with it.

There is no need to hide behind this mystique with minicomputers, he said, since such systems should be used to solve business problems and the emphasis should be on that rather than on bits and bytes.

As mini systems are pushed out into using departments, people are more dependent on them than they are in the batch-type shops, he noted, which means the systems have to be more reliable and "idiotproof."

The documentation also has to be "idiotproof," he added, because the systems will be used by people unfamiliar with operating systems and languages.

'Fire the DP Department'

Elizabeth Rather of Forth, Inc. noted the use of minicomputers is narrowing the gap between the top management of a company and that company's DP personnel.

Previously, she noted, management had to turn over the company's information to DPers "who speak a different language," and this prevented a lot of computer use.

This has changed with the mini, she said, because users "can get systems they understand – particularly programmerless systems."

Small businesses – and perhaps larger ones as well – should "fire the DP department," she contended.

If a firm did this, the top management would "find out what has been going on – discover the inanities" in the present systems, she said.

With such a move, programmers would be forced to write programs for users and not for other programmers, she added, because they would be forced into the user part of the organization.

Today, Rather contended, the job security of a programmer "depends on not finishing the job" because a programmer is rarely fired in the middle of a project.

If there were no DP department, just the opposite would happen, she said. Programmers would write good code, provide good documentation and do the job right the first time, she claimed.

On the other hand, Peter van Berkel of Consultdata Nederland said minis are giving users more motivation to use computers because they can work with the systems without having to go through a DP department.

Technology is no longer the driving force for either decentralization or centralization, he added, explaining adequate technology is available for both types of management.

But the idea of decentralization often raises the fear on the part of managers that they are losing control over their operations and does open the door to the possibility of poor or unauthorized use of systems, he said.

Because of this, minis should not be introduced as part of unplanned growth of DP, he said. A strong central authority should still be in control of DP to plan the use of systems and to keep from "reinventing the wheel."

"Sycor service keeps my network uptime to 98.5%."

Bill Dierkes, VP Information Systems, The Keebler Company.

The Keebler Company, second largest producer of cookies and crackers in the U.S., has six bakeries and 63 distribution centers serving 90,000 retail outlets. Keebler's sales force of more than 1200 used to mail 40,000 orders per week to the 63 distribution sites, where processing and invoicing were done manually. The problem was, these orders weren't getting processed fast enough.

The installation of Sycor intelligent terminals changed all that. And established a new set of order processing standards. Operating at peak efficiency, invoices are now transmitted from the CPU back to the branch locations the same day orders are received. Keeping up this level of performance demands terminal and service reliability.

Keebler puts Sycor to the test.
After a year of operation, Information Systems VP Bill Dierkes wanted to know how reliable Sycor terminals and service were.

"I conducted a survey of 61 of our Sycor terminals from December, 1975 through May, 1976. Some of the terminals were in out-of-the-way places like Minot and Fargo, North Dakota; Billings, Montana; and Pocatello, Idaho. Places where service might be a problem.

"What I found out really amazed me. Naturally I expected the terminals to be reliable, and I expected Sycor to back them up with good service. But even I was surprised to find that, when a station went down, *80%* of the time it was back up again in four hours or less. And *95%* of the time in eight hours or less.

"When you consider that each location uses the terminal an average of eight hours per day and that there are 127 working days in the six-month period surveyed, the total system was up 98.5% of the time."

A Sycor intelligent terminal is a management tool.
Beyond fast maintenance and reliability, Bill Dierkes has found many other benefits from his network of Sycor intelligent terminals.

"Price, ease of installation and the Sycor terminal's ease of operation were other factors I considered. But the real benefits emerged when the system was installed. As soon as it was up and running we were able to reduce order processing labor by 75%, inventory by 15%, and process 40,000 accurate invoices per week. My Sycor system is a real management tool.

"We're extremely satisfied at Keebler with the overall performance of Sycor terminals. And the people responsible for maintaining them."

Put Sycor to work for you.
Find out how much Sycor intelligent terminals and responsive service can mean to your EDP network's efficiency. Send in the reply card today.

If the card is gone call one of our nearby sales offices. We're listed in the Yellow Pages under "Data Processing Equipment." Or contact Bill Newell, our national sales manager, at Sycor, Inc. Corporate Offices, Ann Arbor, MI 48104.

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SYCOR

Editorial

What's the Point?

Seven top IBM executives – including the corporation's board chairman, Frank T. Cary – were brought into court under subpoena by the U.S. government to testify in the trial of its antitrust suit against IBM. But they never took the stand [CW, Oct. 25].

None of the seven knew anything about two IBM internal documents the government hoped to put before the court as evidence the corporation tried to lower its market share estimates when it became apparent the Justice Department would bring IBM into court on charges of antitrust violations.

The Justice Department believed the action was ordered by the judge. Even without this sanction, the government's move might have been viewed as "a bold stroke" had its attorneys not been told by IBM counsel the day before that the seven executives knew nothing about these two exhibits.

Ever inflexible and unimaginative in their approach to the trial of this massive suit, the Justice Department lawyers had them come to court anyway.

Certainly, the government attorneys might have been concerned they would not get *any* of the information they sought regarding these documents. Calling Cary and the other men could have been viewed as a club over IBM counsel's collective head – ready to fall should the defense fail to provide the needed information.

But the government should have been prepared to follow through by having each IBM executive climb into the witness box and state for the record he knew nothing about either document.

What of IBM counsel? Didn't these attorneys have a responsibility to minimize the waste of resources the government subpoenas precipitated? Couldn't lead attorney Thomas D. Barr have told the judge the effort to bring people from Paris and Minnesota, as well as Armonk, N.Y., would be futile?

Like the government lawyers, IBM's attorneys acted in this instance as they have in the past – only more so. Though representing the defense, they took the offense. Normally not a bad approach, this time it seemed overdone.

Barr hauled people and paper into court to prove one point in particular: IBM shouldn't have to do *all* the government's work – considerable and difficult though the effort may be – for it. While the attorney may have succeeded in illustrating this position, it is doubtful whether it will make any difference.

And what of the judge? He, too, responded predictably.

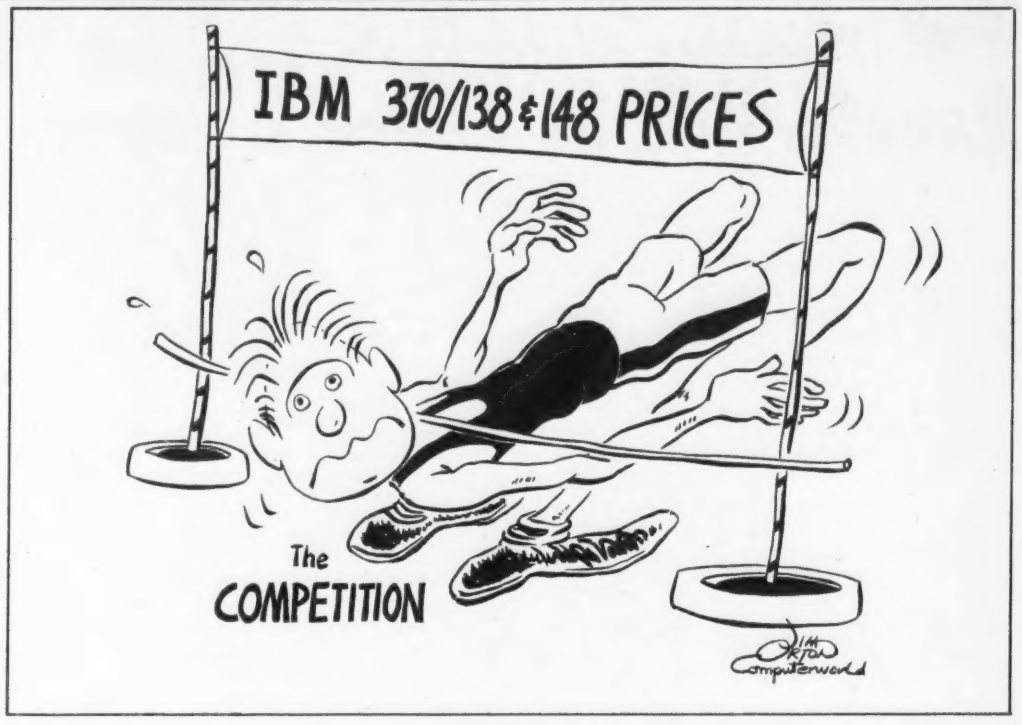
Watching this spectacle from the bench, Judge David N. Edelstein told the parties he had ordered members of the IBM executive suite to appear *only* if the parties couldn't agree on the foundation behind the documents in question.

Trusting the advocates to choose the "reasonable" solution to the problem of who authored these documents and why, Edelstein made it clear he did not expect the government to take this step.

After 25 years on the bench and over four years of close contact with these parties, Edelstein should have known better.

The animosity between the IBM and government attorneys is too great; the stakes in this suit are too high to permit cooperation in this litigation. It's long past time that the judge took charge of this trial and ran it to some conclusion.

U.S. taxpayers now owe witness fees and travel expenses to each of these men. What was the point?



Letters to the Editor

Carter Coverage Gives Impression Of Cheap, Partisan, Political Shot

"DP Catches Carter Contradictions" [CW, Oct. 18] was imprecise and, therefore, distorted. It left the impression of a cheap, partisan, political shot.

The article purported to detect discrepancies in Presidential candidate Jimmy Carter's statements on the "right-to-work" section (14B) of the Taft Hartley Act.

The article indicated candidate Carter said:

- He had not advocated repeal of Section 14B.
- He would (when he was governor) have signed the repeal if it had passed the Georgia Legislature.
- He thought 14B should be repealed.
- He would not campaign for repeal of 14B but would sign such a repeal if it passed the U.S. Congress.

If one examines what was said, one will find consistency, not discrepancy. It is possible to favor repeal without giving high priority to the effort needed to campaign for it. It is also consistent to be willing to approve the repeal if those who give it a higher priority are able to get approval by Congress.

Carter's statements are consistent. They also indicate an analytical thought process capable of establishing priorities and conserving energies needed to focus on highest priorities.

Albert Mendall Jr.

Hyde Park, Mass.

Article Seems to Aid Ford Camp

"DP Catches Carter Contradictions" seemed to me to politicize *Computerworld* to the benefit of the Ford candidacy.

What is the *Gastonia Gazette* and what is its political preference? Who placed this article in CW? Was this done to hinder the campaign of Jimmy Carter?

Where are the discrepancies on Gerry Ford's positions in recent years? Perhaps they could start with the statement he made that he would not run for President if he were confirmed by the Senate during his Vice-Presidential hearings.

Tracking a candidate's position over time makes an interesting exercise, but it should be applied to both candidates, not just one. Otherwise, it should not be published by CW, which I assume holds an independent position in the forthcoming election.

John J. Cullinane

Wellesley, Mass.

DG Advertisement in Good Taste

After carefully reading and rereading Robert D. Tennyson's comments on the term "Mother" [CW, Oct. 10] as referenced in Data General's (DG) Eclipse C/300 ads, I've come to the conclusion Tennyson is obviously not familiar with the industry's list of colorful nouns when relating to IBM (the company, not the hardware).

I think the DG ad was in good taste as well as being to the point. We can only hope Tennyson goes on just "looking at the pictures" and dares not read the communications section. "Ma" Bell, Tennyson, is also not meant as a slur.

Fine work, *Computerworld*, for publishing such thought-provoking ads.

Bruce R. Wiens

San Francisco, Calif.

Data Past

Five Years Ago
November 3, 1971

SAN FRANCISCO – An attempt to stall RCA contract certification until the company agreed on higher levels of support was made by the RCA Computer Users Association (CUA). Delegates representing over 25% of RCA's users declared they would refuse to recommend to their managements a settlement with RCA unless it agreed to the support requests made during CUA meetings.

– – –

LOS ANGELES – A human error on a municipal computer tape necessitated mailing corrected tax bills to 230,000 residents of this city at a cost to county tax assessors of about $50,000. It was only by chance the error was discovered, avoiding the "monumental" problem of overpayments that could have totaled as much as $15 million or $50 per taxpayer, according to the city's Data Service Bureau director.

Eight Years Ago
October 30, 1968

WHITE PLAINS, N.Y. – IBM announced four of its 360 systems were taken out of "full new production." A continuing supply of the systems would be assured by returned, reconditioned equipment which IBM warranted as equal to new machines in performance and price, a spokesman said. The move resulted in increased rental, purchase and leasing costs by eliminating the federal tax credit. It was not clear at the time whether the IBM action was dictated by a growing surplus of returned machines or a sign that production was being phased out to make way for production of later versions of the affected models.

– – –

WASHINGTON, D.C. – The Justice Department and the Electronic Industries Association joined the fight against the revised foreign attachments tariff scheduled to go into effect Nov. 1. Justice opposed the provision that would allow AT&T to force the use of its own network control and signaling devices. The department contended the restrictions ran counter to the Federal Communications Commission's decision in the Carterfone case, in which it threw out the foreign attachments tariff.

Contracting With IBM May Be Cheaper in Short Run

By James H. Conole
Special to Computerworld

The Itel Corp. IBM 370/158-compatible system [CW, Oct. 18] has given the 158 user a choice similar to that offered to the 168 user by Amdahl Corp. a year ago. Since price/performance is the principal reason for moving to a non-IBM CPU, it is very important for the user to be able to assess this ratio as realistically as possible in deciding between an IBM CPU or an emulator from another firm.

I will not attempt to discuss the performance factor, as the user can estimate this based upon tests and benchmarks he can run himself. I wish to address the element of price which cannot be determined by merely comparing IBM's list purchase price against Itel's or Amdahl's.

The true cost of a system is determined by the length of time the user expects to use it and the residual value of the equipment that remains when he no longer wants it in his shop. The user who plans to keep the system only a few years will find going with IBM is cheaper than purchasing or leasing either the IBM or the non-IBM CPU from a third party.

For the user interested in keeping a system three years or longer, the purchase or third-party lease of an IBM system becomes progressively cheaper than a direct IBM rental and can be compared favorably with a purchase or third-party lease of the non-IBM alternative.

Residual Assumptions

Based on 11 years of experience with the 360 generation and more than five years with the 370 generation, we believe the residual value of IBM 370s can be tied to delivery dates of its next generation of machines.

Assuming IBM will be shipping its next generation systems in quantity by the end of 1979, we can estimate the 158s and 168s (Model 3 version) will be worth 50% by then, 35% one year later and 25% two years later.

The 370 values are enhanced by the effect of inflation and the fact that memory prices at the end-user level are not dropping as sharply as they did during the past generation.

Using these assumptions, we can take a typical 370/158 Model 3 with 2M-byte memory, five channels and a console and compare it to a similarly configured Itel AS/5 to show in a shorthand manner the effect of residuals on effective cost.

IBM's Monthly Availability Charge (MAC) price on the 158 is $52,589, and the list price is $2,419,445. Assume the Itel price is 75% of IBM's since a price list has yet to be published.

To discount the residuals and compute equivalent monthly rental prices, use a 10% interest rate, which is above the borrowing cost of most users but below their average cost of capital. Note that we are determining an effective monthly charge even though the equipment is being purchased by the user.

Assumed Retention Period	Three Years		Four Years		Five Years	
	IBM	Itel	IBM	Itel	IBM	Itel
Estimated Residual Values	50%	20%	35%	10%	25%	10%
Present Value of Residual	37.1%	14.8%	23.5%	6.7%	15.2%	6.1%
Net PV Cost of CPU	62.9%	85.2%	76.5%	93.3%	84.8%	93.9%
Net Monthly Charge (% x List)	2.03%	2.75%	1.94%	2.37%	1.80%	2.00%
IBM $/mo	$49,115		$46,937		$43,550	
Itel $/mo		$49,900		$43,005		$36,203
% Savings on Itel CPU		-1.6%		8.4%		16.9%

IBM vs. Itel Price Comparison

Reader Commentary

As we can see from these assumptions, the Itel system is more expensive if the user expects to keep the processor only three years. In fact, for a three-year expectation, a user in most states would probably sign an IBM 48-month contract at $47,856 and pay the three-month penalty upon termination.

The principal advantage of a purchase in this case would be the ability to use the full investment tax credit (ITC), even though it will be partially recaptured in the future, and the avoidance of future IBM price increases (except maintenance).

On four- and five-year assumptions, the Itel purchase becomes progressively cheaper than the IBM purchase, but at no time does the effective monthly savings percentage equal the percentage discount quoted on the purchase price because of the higher IBM residual expectation.

The residual assumptions for the Itel equipment obviously have a major effect on the comparison and must be discussed further. In fact, there is a realistic possibility that any non-IBM equipment (not just Itel or Amdahl) will have very low residual values almost immediately because there is no assured support for the equipment for a second user of a system.

Because Itel and Amdahl retain no residual interest in the equipment, their motivations are not aligned to retention of ordinary residuals we can expect from IBM equipment. In fact, when a vendor is unwilling to bet on the residuals of its own equipment by writing some nonpayout leases, we have a very strong indicator of a poor residual outlook for that equipment.

The best parallel I can cite is the recent experience with another mainframe manufacturer after it sold off most of its base to end users and leasing companies and subsequently announced changes in its support policies for second users of its equipment. The market for that manufacturer's equipment is very low and I am aware of one buyer of a brand new generation who is unable to sell his system for anything approaching 50%, even though the product is only a year old.

For comparison, recent sales of three-year-old 158s have been well over 80% and a 168 was just sold for well over 85%. These are "wholesale" prices paid by dealers to the first user.

In my judgment, any user who buys a non-IBM CPU is taking serious risks if he does not get some commitments from the vendor contractually giving him some of the "equal treatment" that IBM affords by policy to the users of its equipment.

While this admonition is of lesser importance with an established mainframer such as Burroughs or Univac, it is critically needed for a new manufacturer, such as we are discussing. This subject requires more detail than I can go into in this article, but it is vital nonetheless.

While it is possible IBM also could

(Continued on Page 14)

DP Forms Meaningless Unless Understood by Users

The Taylor Report
By
Alan Taylor, CDP

The computer-produced form with a disclosure statement given to Dorothy Allen in 1974 was designed to fit into the national computer system used by Beneficial Finance Co. of Gary, Ind. Because of this constraint, the form was apparently not "in meaningful sequence" – which is a long way of saying it was hard to follow.

Beneficial recently argued before the Seventh Circuit Court of Appeals that the requirement for complying with rules and regulations of the national Beneficial Finance system should protect Beneficial of Gary from a $1,000 award under Regulation Z.

The court, however, had other ideas and gave Beneficial a lesson on what should have happened if some factor like a national computer network requirement caused someone to produce inadequate work. It stated further that the "information should have been transferred to a proper disclosure form by hand."

That's the long and short of of many DP complaints. If a computer system can't produce the required result, then a non-computer should be given the opportunity to produce it; to dare to claim the right to produce improper results is not the answer.

DPers, like other people, have no right to mislabel, misrepresent or confuse others. Using a computer system yields no right to avoid normal standards. The history of avoiding such standards can now be seen in the statute books and, as the harm involved is more widely appreciated, more and more will be seen.

But dealing with the harm involved is only part of the story. The professional question is how do we go about avoiding it in the future. In the October issues of *Computer Law and Tax Report*, Robert Bigelow, editor, commented on the Beneficial case and went on to suggest DP management "must be sure to clear proposed consumer forms with its legal department."

This is OK if all you want to do is prevent DPers from going ahead on their own, but it still gives no basis for deciding whether programmers or lawyers should judge the issue of meaningfulness – an issue which has been addressed here from time to time.

Meaningful to Whom?

The first question is: To whom should the form be meaningful? The man in the street? The legal department? The programmer? Hopefully, by merely asking the question, the answer becomes obvious. It is none of the above.

Clearly, the form has to be checked for meaningfulness by the people to whom it is to be given, under the normal circumstances involved. The simplest way to find out whether it will be meaningful is to give each person a sample form and then a quiz about what it states, noting how long it takes him to work it out.

Anything which is specifically on the form should, in my judgment, be able to be found in less than 30 seconds. Items which are not on the form directly but which can be calculated from it will be expected to take less than two minutes.

These times are not really average ones. The normal requirement is that they are understood by and clear to anyone liable to receive them. Thus, the outer limit, the people who require the most time, has to be examined. And, it goes without saying, an adequate sample will be used.

Another problem that arises is that the form is designed to come out from the computer in many different circumstances – sometimes saying "yes," sometimes saying "no," etc. But a form that is meaningful under one set of circumstances will not be meaningful under another, so the tests then have to be set up to cover each variety of the form or, at least, all the complex ones.

Under What Circumstances?

Another whole variable is the circumstances under which the testing takes place. In the case of some forms, particularly in hospital environments, the situation may be that the recipient is in no condition to concentrate or to comprehend even the most meaningful form, but will simply sign without reading.

This can be tested for by including some fake forms that have outrageous clauses or grossly mistaken mathematics in them. However, for normal business practice I don't think the time has yet arrived for this action to be required by law although, professionally, I would like some of this type for test validation.

The legal people do, of course, come into the decision. They should look over the tests, look over the results and then agree or disagree on putting the form into use or whether to use a different format.

They will need to know about anyone who gets a wrong answer, even temporarily. They will want to know what distracted him from getting the correct answer. So the test should consist of both asking the people to find out what the form says and to explain where they got the answers. The test supervisor should check and find any incorrect answers and interview all such cases.

Lawyers will also want to know the tests they see are not the successful ones selected out of a larger sample on some selective basis. The test forms and questionnaires should, therefore, be numbered and controlled and the interpretations of the results should account for any spoilage as an integral part of the interpretation.

Frequency of Tests

The final part of the operation will probably be to repeat the tests every so often and, particularly, when the forms are to be used in a new environment, i.e., a Spanish-speaking neighborhood, or after the success of a promotional effort, i.e., bringing in blue-collar clients for a previously white-collar service.

Anything like this will invalidate the prior tests and both DPers and lawyers should make sure the tests are rerun successfully.

So, there are the points to be taken into account. Testing is the best way; watching complaints coming in to your own establishment is the second best. Just leaving it to programmers and in-house lawyers without giving them material to work with is simply asking for trouble. Don't do it.

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Going With IBM May Be Cheapest Short-Term Route

(Continued from Page 13)

change its subsequent user policy and damage the IBM residuals, for several significant reasons IBM can be expected to continue its unique and well understood second user policy.

In order to do a more valid comparison of the systems' costs the ITC must be properly factored in along with the user's effective tax rate, his cost of capital and the effect of accelerated depreciation on his net cash costs after taxes.

As a useful guide, I believe the IBM Purchase vs. Lease Analysis Program is sufficiently comprehensive for virtually any user and yields a valid comparison. IBM will run this analysis without charge; although it is obviously another IBM sales tool, it is objective and reliable.

IBM is unwilling to estimate the residual values which must be supplied by the user prior to IBM's running the analysis. This is where dealers and leasing companies can provide some valuable input to the user.

In the case of a user who prefers to lease his system without retaining the ITC, the IBM 370 becomes more cost-effective. For example, it is still possible to obtain a seven-year true lease on a 370, which has important balance sheet implications for most users. Whether a seven-year lease on non-IBM computers would be similarly treated by most auditors is questionable.

With the ITC going to the lessor, recent deals on 370s have seen rates below 59% of IBM's MAC. If terminated at the end of five years, the anticipated maximum penalty discounts back to an effective monthly rental of only 66% of MAC. If the user should keep the equipment six years, there is no significant penalty exposure.

Since a user can also obtain memory for a 158 or 168 from several non-IBM sources for only 50% of IBM's price, he has the power to lower his costs and exposure, especially in being able to economically expand in the future.

Although it is substantially lower than IBM percentages, a market is also developing for used independent memories from the more substantial vendors (but even here my caution on obtaining contractual remarketing assurances is in order).

There are obviously other factors of a nonfinancial nature to be considered in any comparison of IBM vs. non-IBM. As a result of recent failures in the industry of several firms, the stability of the vendor should be particularly evaluated by the prospective user of non-IBM mainframes (not an easy job because of the previous unreliability of accounting standards).

It may still prove advantageous to install the non-IBM equipment in certain cases. But if the user has properly considered the economic factors he will have made his choice based on a truer picture of the real financial benefits and risks. Thereby, he will reduce the prospects of having set up his firm and himself for a major embarrassment in the future.

Conole is president of Westwood Leasing Corp., a lessor of IBM equipment located in New Rochelle, N.Y.

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Letters to The Editor

Objections to CDP Exam

I am writing with regard to the advice in the Oct. 11 Taylor Report on how to answer two questions taken from the *CDP Guide and 1977 Announcement.* I have more than a problem with these questions and the "correct answers" – I have a fundamental objection to the implied reasoning used in obtaining the answers.

In the first place, while the rationale in selecting answer 2 to question 18 may be acceptable if one is dealing with an entry level coder (although it certainly is not in our business), by no measure does it provide the "best estimate of the largest number . . ." Clearly, a judgment is called for rather than blind arithmetic.

Secondly, since question 1 is written so no single-listed answer is always correct and, by Taylor's admission, most microprograms are stored in read-only memory (ROM), no case can be made for any other answer that is stronger than the case for answer 3.

K.J. Sroub
Cleveland, Ohio

Exaggerated Obituary

Mark Twain once said the reports of his death were greatly exaggerated. A similar statement applies to the PL/I Language Specification manual. The Data Past of Sept. 8 repeated a false allegation from *Computerworld's* Sept. 4, 1968 issue: The manual no longer exists.

The corpse, however, seems not to have been informed and the current bibliography showed it has gone through three editions since its demise. And since the order number is GY33-6003, it is presumably available for free.

While I can understand how it is possible to be confused when an order number changes, no responsible newspaper would publish such a claim without asking IBM for comment. I, for one, had no difficulty ascertaining the new number and obtaining the new edition.

Seymour J. Metz
Arlington, Va.

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WANG

Univac 90/60s and DMS/90

Hardware/DBMS Mix Supports Insurance Group

DES MOINES, Iowa – "We're confident our system will be a major factor in making all our operations more efficient and simultaneously upgrade the quality of our services," Howard E. Clendenen, president of the Statesman Group, Inc., a multiline insurance concern, said recently.

This year the property and casualty insurance industry is "bottoming out" after the worst year in the industry's 225-year history, he noted. "Because of this, we're carefully reviewing all of our operations to find where savings can be made without a negative effect on operations.

"That's where our computer network can be a big help. We feel we've got a system now that will allow us to expand in an orderly fashion rather than on a patchwork quilt basis.

"Working as we do with independent agents who may be representing a number of insurance companies, it's essential we provide the best possible service to induce them to direct their business to us. At the same time, we want to do this without incurring excessive expense," he said.

Statesman is listed among the top 100 companies accounting for about 85% of the total property/casualty/life insurance premium volume in the U.S. Net premiums written by all group companies and affiliates exceeded $100 million in 1974 and 1975. The group is licensed in 43 states and has assets exceeding $166 million.

The company's computer complex is built around two Univac 90/60s. One of the systems, in Statesman's headquarters here, serves the western U.S. The other, in the Indianapolis, Ind., offices, serves the group's business in the eastern half of the nation.

Replacing Univac 9400s, the 512K 90/60s were installed in February 1975. Terminals here include five Uniscope 100 CRTs and three Univac 1900 Computer-Assisted Data Entry (Cade) units.

Plans call for Uniscope 200 display terminals to be placed in the claims, underwriting and accounting departments.

The system here is connected to an IBM 2780 at American Life and Casualty Insurance Co. in Fargo, N.D., an IBM 2780 with Vulcan Life and Casualty Insurance Co. in Birmingham, Ala., and a Uniscope 100 at the Empire Insurance Co. in Santa Ana, Calif.

The Indianapolis 90/60 also has links to the IBM 2780 terminal in Birmingham.

Present applications are processing automobile, fire, casualty and life insurance policies, premium and agency accounting, claims and reserves accounting and preparation of statistics.

Aid to Efficiency

The data base management system (DBMS) now being installed – DMS/90 from Univac – will play a large role in assisting Statesman's directive to practice utmost efficiency in all operations, according to Don Sheil, the DP director.

"Two immediate benefits will be faster claims processing and more efficient processing of policy information," Sheil said.

"DMS/90 will eliminate file duplication. It will maximize efficiency and provide much faster service to our agents and insureds. Most policy and claim information will be processed within a 24- to 48-hour period. We will have an on-line data entry capability to update our files and service inquiries," he added.

The DMS/90 system design incorporated recommendations of the Codasyl Data Base Task Group, and was a major factor in the choice of this particular DBMS, Sheil indicated. In addition, he noted, DMS/90 appeared "to be the path with the least change involved.

"We are building into the data base a flexibility to allow our member companies to retain their individual identities. We've grown very fast over the past 14 years to the point that we now consist of 29 member and affiliated companies, but we believe it's important that control of each individual company continue to reside with its own management.

"DMS/90 can break down the information any way we want it. We can obtain the data in any manner or sequence. Previously we had to access several different files to get what we needed," he recalled.

"Our aim is to provide a company with an information system responsive to the needs of the user departments at the home office, at member and affiliated companies and at agents' offices," he said.

The data base will consist primarily of policy information, customer names, addresses and details of their policies. It will also contain information on the 3,000 independent agents representing Statesman.

Noting DMS/90 is being implemented in well-planned stages, Sheil explained the first operational application planned is private passenger automobile insurance. This is expected to be on-line this winter.

Other applications will be added gradually with the expectation that all of the information will be in the data base by the end of 1977.

Operating System Switch

The company started with the original OS/4 operating system when the 90/60 superseded the 9400, Sheil noted.

"After Univac introduced the Virtual System/9 [VS/9], we started conversion to this operating system with its more efficient utilization memory.

"One of our member companies, Empire Insurance, is now running completely on VS/9 and we have made considerable progress in converting our other operations," he said.

New policies written are mailed into Des Moines by the agents. After checking by underwriters, the information is entered into the system using the Cade and Uniscope 100 terminals. Previously the information was keypunched.

With the terminals, Sheil said, the extensive coding needed with keypunching is eliminated and data input is at least twice as fast, improving policy turnaround and allowing the company to speed up billing.

"If we need to check policies on file or obtain a history of policyholders, we can call up the information on the CRTs within a few seconds. This eliminates the older method of having to manually pull files from among the 600,000 policies kept in paper files. It will also allow clerical personnel to be assigned to more important tasks," Sheil said.

In addition to the on-line policy work, the computer also prepares a series of monthly management reports outlining underwriting and loss activity as well as expense distribution.

Data 100 Enhances Keybatch Software

MINNEAPOLIS – An update of the Keybatch software now available from Data 100 Corp. enables users of the company's recently enlarged Keybatch keystations to work with a variety of capabilities for the first time, a product bulletin indicated.

Among the features included in Version 3, Release 1 of the software are support for "in-line" tables to speed data validation, Indexed Sequential Table Retrieval (ISTR) capability comparable to Isam capabilities in other systems and two forms of line-level table and program updating expected to be useful in central support of dispersed keystations, Data 100 said.

Features available in earlier releases have been extended. The number of local keystations, for example, has been increased to a maximum of 16, including eight running concurrently, a spokesman noted.

The system will support three remote stations, rather than two as previously, and emulators for various communications environments can be used concurrently, he added.

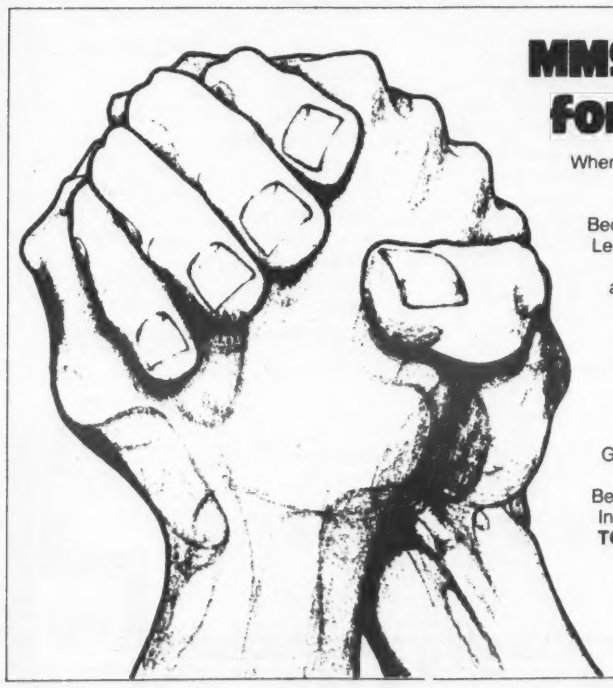
The ability to have lookup tables directly in-line with the user's program code is important, the company said, because it eliminates the need to keep track of where the table is and how far through the table a search has gone.

Both of these chores can distract a programmer from the main purpose of the application coding, the spokesman explained.

Other added features are said to include queued data displays, expanded use of arithmetic and logical operators, right- and left-shift accumulator operators and better support for both magnetic tape and disk.

Version 3 Release 1 requires an FML-11 processor with 65K bytes of memory. The FML-11 is a newly released configuration of the company's Model 74/78 Keybatch hardware, the spokesman added.

While there is no cost for the basic Keybatch software package, there are "minimal" costs for some of the features, including concurrent data entry and some of the communications emulators, he said from 5701 County Road 18, Minnetonka, Minn. 55343.



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Study Documents Comparative Network Use Costs

STAMFORD, Conn. – *A Comparative Remote Batch Cost Analysis Report*, recently published by Real Decisions Corp. (RDC) documents the costs of running a set of standardized programs on various commercial networks.

Beyond that, however, RDC has said it will run the same programs utilized in the report on systems belonging to purchasers of the report at no extra charge.

In that way, users can see how their own environments compare with those provided by the network vendors, RDC said.

The primary purpose of the report was to compare effective costs of operation and pricing structures on several major vendors of remote batch services. RDC designed a series of runs to utilize comparable resources – to the extent possible – on Control Data Corp., IBM and Univac equipment, the research firm said.

The bulk of the report itself is made up of 27 graphs showing how specific runs fared on the different networks and on different pricing choices within each network. There seems no regular pattern of which services are "best" for all runs; instead, the reader is left to pick the network according to the type of work being done.

The basic set of runs included in the report were all written in Fortran, "the most directly comparable language to use on a variety of services," a spokesman explained.

Five runs were classified as CPU-intensive, requiring increasing amounts of core storage and computation. Six runs constituted the I/O-intensive series and utilize minimal computation and a standard amount of memory, RDC said.

RDC modified and mixed the runs to find the cost of different job streams, the report added.

RDC contracted with the vendors for use of the resources but, as the report noted, RDC controlled the operation and monitored the results of all runs and all combinations of runs.

The 97-page report costs $1,995 and is available from RDC at 870 High Ridge Road, Stamford, Conn. 06905.

Airline Information Now on APL Services

RICHMOND, Va. – An airlines origin-destination data base now available from the APL Services Division of The Computer Co., Airmarket is said to be based on statistics collected quarterly by the Civil Aeronautics Board.

The data base can be used to derive revenue passenger miles, total passengers ticketed and each certified carrier's market share and market ranking for each quarter year since 1972 by mileage and city codes, according to a division spokeswoman.

Facilities available with Airmarket permit the user to create unique data bases, perhaps combining some of the given data with other material collected from other sources, she said. A report generator is also part of the Airmarket "package," she added.

The data base itself gives total airlines statistics for more than 68,000 domestic city pairs and detailed carrier information for more than 26,000 city pairs.

The data is available in both on-line time-sharing mode and remote job entry batch operations with results returned to high-speed printers at the user's site or at The Computer Co.'s offices, the firm noted from 1905 Westmoreland St., Richmond, Va. 23230.

No Need to Know DBMS on Nets

MINNEAPOLIS – People who work with data base management systems (DBMS) installed on commercial remote computing networks apparently do not need to know the inner workings of the systems as much as do people who work with DBMS installed on in-house configurations.

That at least is the impression left after reading *A Study of the Use and Availability of Data Base Management Systems* in remote computing services in the U.S., recently compiled by Info-Dyne, Inc., a research organization based here.

Only nine of the 59 users of "remote" DBMS who responded to Info-Dyne's queries claimed to know their DBMS "inside and out" – even when the systems involved were familiar ones.

The same lack of concern was highlighted in Info-Dyne's summary of trends when the report noted "from a practical, technical standpoint, there is very little difference between Nomad, System 2000 and Oliver, for example . . . Otherwise equivalent vendors, each with one of these systems, would seem to most prospective users to be virtually identical.

"In the minds of the users, the major areas of differences between (the available) DBMS are not in the features area but rather in other areas like quality of support, documentation and vendor staff and price," the report said.

Info-Dyne is at Suite 196, 4600 W. 77th St., Minneapolis, Minn.

UCC Installs Enhanced Exec 8

DALLAS – Remote batch computing services based on Univac 1108 running under OS/1100 (the current version of what used to be called Exec 8) are now available from University Computing Co. (UCC).

The service provides a multiprogramming environment suitable for program development and production processing of both business and engineering applications, UCC said. There are, for example, the two Fortran and two Cobol compilers that are standard with OS/1100, a spokesman noted.

One of the Cobol compilers is "very IBM-compatible," he added, suggesting perhaps one group of users the company expects to support.

For engineers, application systems presently on the service include the Integrated Civil Engineering System (Ices) and the Functional Mathematical Programming System (FMPS). Ices includes the structural design package Strudl II; FMPS is a linear programming application for operations research projects, UCC said.

UCC's network is accessible and users are supported from more than 30 offices throughout North America and Europe, the spokesman added.

The company's Scientific and Engineering Division can be reached through P.O. Box 6171, Dallas, Texas 75222.

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'Etos' Enhanced for PDP-8s

HARTFORD, Conn. – An installation with a Digital Equipment Corp. PDP-8 can support simultaneous time-sharing, real-time tasks and batch operations even though each operation is running under a DEC-supplied single-user environment with the Educomp Timeshared Operating System (Etos), according to its vendor, Educomp Corp.

Etos, like IBM's Virtual Machine (VM/370) facility, permits concurrent users to work as if the system were completely theirs, including as much as 32K words of "virtual" memory.

Each may work with a different operating system or several may use different parts of the same system at the same time, Educomp said.

In addition to broadening access to various DEC operating systems, Etos also provides extended programming support under OS/8. Languages under Etos include a "solid" Fortran IV, Assemblers, Educomp's Extended Basic and Cobol/8.

Printer spooling and card reader spooling have been added to Version 4B of the system, which was released recently. Support for detaching programs is said to have been improved and commands simplified.

Partial job accounting is a feature of this version and file structures under Etos are said to be more sophisticated than before.

The Etos software requires an omnibus PDP-8 modified by the insertion of Educomp's TSC8-75 time-share control printed circuit board.

The TSC8-75 and software are available as a package for $4,900, the spokesman added from 196 Trumbull St., Hartford, Conn. 06103.

'Inquire' Gets Search Feature

FALLS CHURCH, Va. – Proximity searching, an option added to the Inquire data management system from Infodata Systems, Inc., is said to ease the searching of large textual data bases to locate text or documents containing specific words, according to an Infodata spokesman.

With the Inquire command language and the proximity searching option, users can locate documents which contain one or more words within the same field or sentence, within a specified number of words or sentences of each other and in a specified order, he said.

The contents of both text fields and other fixed or variable fields, as well as optionally assigned index terms, can be searched by the same command. Once the desired documents have been located, the user can control formatting and printing, the spokesman added.

The proximity searching feature operates on existing Inquire data bases without reorganization. New documents can be added to the data base and old documents modified, the company said.

Inquire, including the search option, operates on IBM 360/370 CPUs under OS, OS/VS1 or VS2. It requires a minimum of 130K for the command language processor and costs $16,500 to $76,500, depending on options selected.

Infodata is at 5205 Leesburg Pike, Falls Church, Va. 22041.

Sectioning Array 'Not New'

By Richard C. Rockwell
Special to Computerworld

Bruce Weinstein's "Sectioning Base Array Voids Fortran Size Problems" [CW, Sept. 27] described a method of dynamic allocation of arrays long used by application programmers in writing statistical packages, particularly for the social sciences.

For example, the Data-Text project at Harvard University used this technique in the mid-1960s, and Earl Jennings used it in a statistical package at The University of Texas at Austin, perhaps somewhat earlier.

I strongly suspect it is used in both the Osiris and BMD packages; IBM's Scientific Subroutines Package also allows its use.

Weinstein missed one of the side benefits of this method of array allocation: the ability to define arrays of four or more dimensions. An arithmetic statement function may be used to determine the appropriate location in the single-dimensioned array for an element with subscripts i, j, k, . . . m.

In addition, this facility may be used in conjunction with an algorithm to permit dynamic determination of the number of DOs to be executed in a program – not just of the number of iterations of each DO. As most Fortrans restrict the level of nesting of DOs, this facility has limited but important use.

Rockwell is a Visiting Fellow at the Boys Town Center for the Study of Youth Development, Omaha, Neb.

Package Called Diagnostic Tool For 'Most' Abended Programs...

CLEVELAND – The Abend-Aid package from Neoterics, Inc. was designed to provide computer-assisted analyses of abnormal program terminations (Abends) to programmers working in IBM OS or VS environments, Neoterics said.

The package diagnoses "nearly all" Abends, providing the user with information on what occurred, where to look in manuals for additional information and specific details required to correct the problem, according to the company.

Abend-Aid output is limited to a single-page report on each termination, with the corrective information in "English-like text." By eliminating lengthy core dumps, this output reduces computer time, disk queuing and paper consumption as well as programmer time, a spokesman added.

More than 160 unique Abends are diagnosed, including Program Exceptions, Data Exceptions and "almost all current Access Method file problems (including Vsam)," he said.

Each supported system Completion Code has its own user-supplied "what-to-do" option which can be overridden on a program-by-program basis, he added.

The modules needed to service an Abend are brought into memory dynamically once the type of problem has been diagnosed. In that way, the memory required by Abend-Aid is kept to a minimum, Neoterics said.

No changes are needed in the logic of Assembler, Cobol or Fortran programs to utilize Abend-Aid, nor is any modification required in the IBM-supplied code for OS/MFT, OS/MVT, OS/VS1 or OS/VS2 (SVS), the firm added.

Since the interface routine can be dynamically loaded, overhead for the Neoterics system is approximately 800 bytes. Memory used by the diagnostic modules is returned to the system before further processing occurs, the spokesman explained.

The basic Abend-Aid package costs $2,975 or $175/mo. Separately priced modules – covering Cobol dynamic load, for example, or Cobol segmentation – range from $150 to $950 or $10/mo to $60/mo extra, he said from 330 Investment Plaza, Cleveland, Ohio 44114.

...Giveaway Shows Existing Problems

CLEVELAND – A free package that may help users determine if their installations could effectively utilize an analysis tool such as the Abend-Aid package (see story above) is available from Neoterics, Inc.

The SMF Abend Analysis (AbaidSMF) program will read a data set containing the user's SMF data and produce a report showing the number and type of Abends that took place during the SMF reporting period, Neoterics said.

Other data produced includes the number of lines and pages printed in Abend-generated memory dumps and the time it took to print those dumps.

The report also shows how many of the Abends would have been handled by Abend-Aid and how much printing time and supplies would have been saved, a spokesman added.

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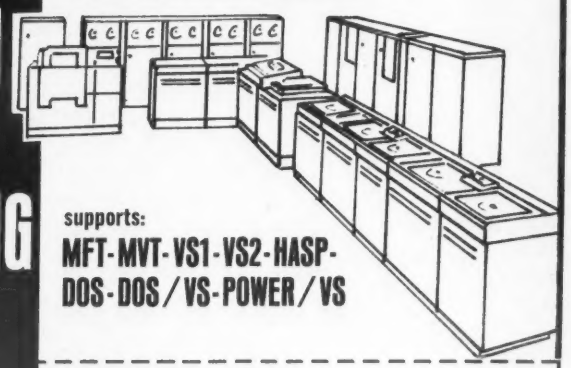

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Despite Flawed Systems, This User Still Has Hope

By Jack Stone
Special to Computerworld

We in the computer community sometimes discount negative reactions from end users more than we should. That's why I was so shaken by a conversation I had with Nora C. Manning, a recently retired former owner of an insurance agency in the Midwest.

As you can see from the following transcript, Manning is a long-time end user of systems implemented by the companies she represented. Almost incredibly, she is still hopeful of future benefits, even though the systems slowed some of the services she provided and apparently caused dollars-and-cents damage to her business.

Read on, then – please – make sure the end users of systems you're managing can't say the same about their experiences.

Q: How long were you in business?

A: For 43 years. I was the sole owner of my agency since 1957, when my husband passed on, and transferred the business to my oldest son when I retired this year.

Q: Would you briefly describe your business operations?

A: Our agency provides the full line of fire and casualty insurance services for personal and commercial accounts. We represent the lines of 10 different insurance companies.

The Human Connection

About 65% of our business was obtained from commercial accounts. When I retired, the agency had about a thousand active accounts, primarily in Kansas, handled by four full-time employees.

Q: I assume your paper-handling workload was substantial.

A: Oh, yes! And, as you can appreciate, the policies, their endorsements and billings must be accurate and timely to give the customers the assurance they are properly protected.

Q: Could you describe how you handled the work in the old days? How effective were your procedures then?

A: Oh, we had wonderful procedures! They were very important in helping us give the good service our customers have come to expect.

Each company supplied us with blank forms. We were usually able to issue policy and endorsement requests the same day we received the orders and send the material out to the customer, along with an invoice, within a day or two.

You see, in those days, the agent had complete responsibility for selecting the coverage and figuring the premium. Naturally, we sent copies of the policy and its endorsements to the insurance company, which maintained central files for establishing premium rates, paying agency commissions and, of course, auditing our premium calculations.

Q: Didn't manual preparation of all those policies, their endorsements and the premium calculations – which perhaps numbered in the thousands last year – lead to many errors in policy coverage?

A: Well, not really, no. You see, my son and I handled all the figuring, and we checked and double-checked premium calculations and other policy data. We very rarely made a mistake of consequence.

Also, we were fortunate in building a loyal group of policyholders by providing them correct and timely policies over many years; an occasional error did not concern them if we contacted them promptly and gave them a proper explanation.

Letters outlining questions, issues or situations pertinent to human relations in the DP setting may be addressed to Stone c/o Computer Education International, Inc., Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

In addition, the company auditor would report to me within a week or two if he found an error.

I don't recollect ever losing a policyholder because we didn't figure the premium correctly the first time.

Q: How and when did computer automation come to your business?

A: Well now, we didn't have a computer in our office. Our insurance companies started their own systems one-by-one from 1968 to 1970. These actions caused substantial changes in the way we handled our insurance forms.

For most insurance plans, for example, the company computer took over the responsibility for calculating premiums and actually preparing policies and their endorsements. We supplied the basic information using an "application" form for issuance of the policy and a "policy change request" form for endorsements during the policy term.

Although the companies offered to send the material directly to the customers, we preferred to have the policies mailed to us for auditing before sending them on to the customers. Also, the companies would automatically send us renewal policies when they were needed.

Q: Now that computers have been working for your former agency for nearly 10 years, what's your evaluation? Did they expand your business, improve customer service or reduce workload and expenses? Did they increase profitability?

A: Our agency people certainly like the computer-prepared renewal notices. This is a real service!

On the other hand, the computer is very slow in handling our policy change requests. We often wait from two weeks to three months before receiving confirmation of changes, whereas we were always able to provide such notice in a matter of a day or two before the computers came.

Furthermore, since we have to check everything the computer sends us (we have caught numerous errors over the years, although it is getting better), our paperwork has substantially increased.

The computers, overall, have probably cost us some profits, not in terms of loss of customer billings, but because our commissions have been cut in recent years, in part because of the heavy expenses involved in bringing these machines into the industry.

I feel that there is a marvelous future for computers in our industry. Much has been accomplished in the last decade, and I believe that with all those bright young computer men and women, our industry should find the computers to be highly profitable in the next decade.

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TITLE/OCCUPATION/FUNCTION
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/ Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mfg Sales Representative
52 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other: _____

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New Technology Forcing Changes In DP Manager Role, AIIE Told

By Don Leavitt
Of the CW Staff

SAN FRANCISCO – Over the next 10 years, data base and on-line systems will change the role of the DP manager "dramatically," according to the president of National CSS, Inc.

On-line processing gives the non-DP manager immediate access to information, but since the coding for this type of operation is "usually not done by programmers, [it] makes more demands on a computer system to be bug-free, reliable and easy to use," Robert E. Weissman said.

The Human Connection

Data base systems generally are capable of supporting different users who have "distinctly different" information needs and who want to have access to their information simultaneously, he added in keynoting a recent American Institute of Industrial Engineers (AIIE) seminar.

Instead of limiting his job to effective management of the corporation's central computer installation, the successful manager of the next decade "will see his responsibility more and more as helping each profit-center manager in the corporation to get the right information at the right time," he said.

Large centralized operations, which seemed natural as they developed in the 1960s, are now being challenged by many things, he noted later, adding "the most powerful agent undermining the sovereignty" of the centralized facility is "the structure of American business itself."

Large corporations are decentralized, "divisionalized" and profit-center oriented, Weissman said.

More and more non-DP profit-center managers "are demanding, have the budgets for and are willing to pay for the delivery of specific answers" to specific business problems. Computers have been "demystified" to a large degree and "[non-DP] managers are comfortable using computers under their control."

The tools for developing a "rational structure" in DP along the lines of the structure of American business "with localized DP operations and customized on-line data base capabilities" are available, he added.

Intelligent terminals capable of working with a corporation's central CPU, standalone minicomputers and commercially available remote computing facilities and networks are among those current tools, Weissman noted.

Despite the possibilities raised by these approaches, however, there is resistance to the change from centralized to dispersed DP operations, he told the engineers. The kind of changes he was describing "are at best a disruption to current day-to-day activities and at worst represent a dire threat to the status quo" in thousands of centralized organizations that exist today.

Since "for the most part they are sound and stable and perform a useful service, the resistance of these centers and their managers to what is only a potentially more efficient distributed DP environment" is quite natural, Weissman said.

The organization that successfully "navigates the turbulent waters" between the factors forcing a change toward a more decentralized system of DP and the still present need for certain centralized functions will have to recognize those factors and make sound organizational decisions, he said.

In designing a DP environment that makes sense for the needs of a particular company, numerous detailed questions have to be answered, he said, providing a dozen or more as examples.

More broadly, he urged the members of his audience to ask themselves, " 'How can an environment be created that fosters constructive change to take advantage of a changing technology?' "

Cincom's 'Knock-About' Planned for Next Week

CINCINNATI – This year's "Knock-About," a conference for users of Cincom Systems, Inc. products, will be held Nov. 7-10 at Stouffer's Cincinnati Inn here.

Open to anyone within using organizations, the meeting has a registration fee of $145, the company said from 2300 Montana Ave., Cincinnati, Ohio 45211.

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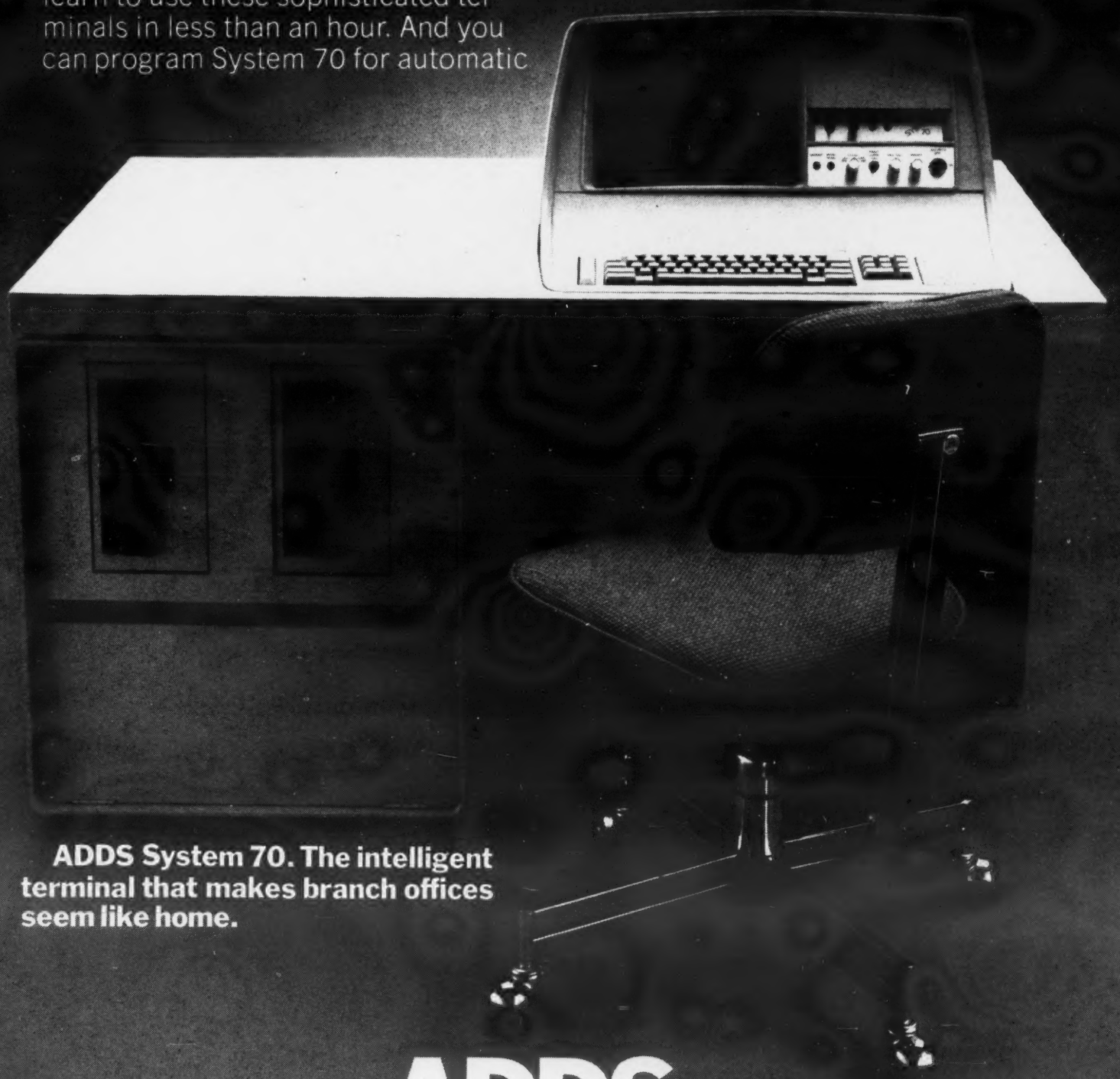

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COMMUNICATIONS

Phone System Called 'Neural Network'

Reform Act Seen Assuring Bell's 'Systemic Integrity'

By Ronald A. Frank
Of the CW Staff

WALTHAM, Mass. – The real issue raised by the Consumer Communications Reform Act of 1976 concerns the "systemic integrity" of the Bell System network, Ted Simis, an assistant vice-president in AT&T's Computer Communications and Data Services Division, told a recent meeting here of the New England Telecommunications Association (Neta).

The telephone system has become a "neural network" with nerve endings that reach into computers, Simis explained. The pieces of the network are all interdependent; before there can be competition for certain segments, each of the pieces must first be made separate cost centers, he said.

Profits Not at Issue

AT&T profits were not an issue in the introduction of the Reform Act, Simis added. "We need a sense of direction. We have got to know the rules so we can live in a competitive environment," he said, adding that is the reason the legislation was presented to Congress.

Simis said the supply of terminal equipment is "not a natural monopoly" and indicated there might be room for competition in this area under some well-defined specifications.

These specifications could be encompassed in the equipment registration program set up by the Federal Communications Commission (FCC), but changes would have to be made since the program is now "weak in performance after design," he said.

The nationwide phone network should ultimately support multifaceted terminals for the business user; systemic innovation, however, should not be discarded in favor of product innovation which would only provide business users with a "short-term advantage in rates," he warned.

Users should present their opinions on this issue, he added.

Marketplace Preemption

Taking issue with Simis was William McGowan, board chairman of MCI Communications Corp., who described the Reform Act as "providing the opportunity for Congress to determine our professional futures instead of allowing the marketplace to do it."

If the bill passes, "we will all be out on the street," McGowan told Neta members.

Under provisions of the Reform Act, Bell would be able to give away services until all competition was eliminated; rates would then rise again, he said.

In addition, the Bell-fostered legislation would hand over regulatory control now vested in the FCC to 50 state regulatory commissions. This would preclude the FCC from ever again allowing competition, he said.

When he first saw the legislation early this year, McGowan assumed no member of Congress would "touch this bill," he said. Now that 40% of Congress has backed it, it is "one hell of a problem."

As long as the legislation is pending, the Bell System will have an advantage over its competitors, he said.

In the final analysis, Congress is very sensitive to constituent input; for this reason, users should do everything possible to transmit their views to their elected representatives, he said.

The entire thrust of recent FCC policy favoring competition has been to give the consumer a choice and to force innovation in an industry where the established carriers have been very slow to introduce new offerings, McGowan said. If users want this to continue, they will have to speak out, he added.

Policy Changes Spawning Services

Communications Industry Now in Transition: Doll

NEW YORK – The communications industry is presently "undergoing a major transition" in the form of new types of data communications services which will affect users in the future, according to Dr. Dixon R. Doll, president of DMW Telecommunications Corp.

The introduction of new communications services has been "spawned by significant regulatory policy changes [that] are enabling many services firms to provide and utilize intelligent data communications networks for multiple purposes," Doll told financial analysts at a meeting here recently.

The advent of intelligent networks, Doll said, contrasts with the computer services industry's traditional use of data communications "merely as a vehicle enabling customers to access processing power, data base and application program resources.

"In addition to traditional computer service activities, firms may also resell excessive network capacity to customers through regulated common-carrier subsidiaries.

"For the last few years," Doll stated, "Tymshare Corp. has offset its network expenses by several million dollars through a provision in the tariffs enabling joint usage of standard voice-grade lines."

Doll was quick to add, however, that other companies have been reluctant to exploit similar tariff provisions.

This reluctance primarily stems from "an historically unclear situation with respect to the tariffs and the legalities allowing customers to utilize computer services networks to obtain plain communications," he said.

"Value-added common carriage has also become a unique factor in expanding the historical marketplace for computer services firms, both at the regional and at national levels," Doll noted.

"Value-added carriers such as Telenet Communications Corp. and Tymnet Communications have filed [with the Federal Communications Commission (FCC)] to establish networks which involve the resale of raw communications capacity procured from the Bell System and other licensed common carriers owning intercity lines," he stated.

"These intelligent networks are enabling regional computer services firms to instantaneously obtain access to national distribution vehicles without the major expenditures and time delays in designing, constructing and operating their own private network facilities," he explained.

Clouded Future

Doll said the future is clouded with respect to the ultimate position of value-added common carriers.

"With the reopening of the Computer Inquiry by the FCC, it appears the Bell System will be prevented from offering DP services per se.

"However, there are many unclear areas such as the regulatory situation with respect to Bell System data terminal equip-

(Continued on Page 24)

Bus Provides Unusual Site for Unusual Application

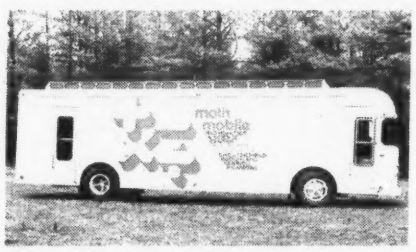
By John P. Hebert
Of the CW Staff

GLEN ALLEN, Va. – A traveling schoolroom is providing an unusual setting for interactive computer terminals in what is believed to be a unique application of full-duplex modems transmitting to a single telephone line.

The Mathmobile journeys to three different elementary schools serving the city of Richmond and the Virginia counties of Henrico, Goochland and Chesterfield to provide computer-assisted mathematics instruction, according to Dr. Wesley Batten, director of the Mathmobile program.

It is equipped with eight General Electric (GE) Terminet 30 teleprinters and one Vadic Corp. VA3405C modem which allow on-line interaction with the Mathematics and Science Center, a consortium of four public school divisions here, Batten said.

The center houses a Hewlett-Packard (HP) 2000E CPU with two disk drives and 32-port simultaneous operational capability. The CPU was upgraded to



The Mathmobile: Eight terminals, one modem and a single telephone line . . .

make it, in effect, an HP 2000F, Batten said.

"Nobody had ever used eight terminals to transmit information on-line down a single dial-up phone line," he added.

"We were told 'You just can't do it that way,' " he recalled, "and all we need is somebody to say we can't do it and we will do it."

Vadic, piecing the application together, found one high-speed VA 3405C modem with "zero turnaround time" placed in the Mathmobile and one placed in front of a Timeplex T-16 multiplexer at the math and science center would carry the signals down the dial-up line at 1,200 bit/sec, according to Batten.

For a multiplexer to divide an eight-unit data stream, the stream ordinarily has to be split into pairs of four units. With that method, two telephones are required to handle the two groups of four printers, but "we didn't feel like tying up two telephones at each of the schools dedicated for the Mathmobile application," Batten said.

"Nobody wants to have two telephones in their school office tied up," Dr. Shirley

(Continued on Page 22)

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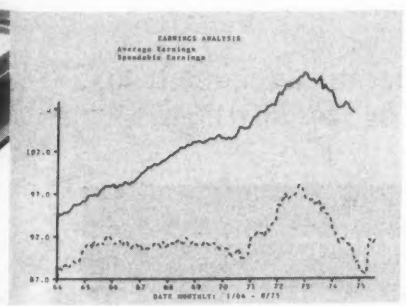

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CSI Multiplexer Works With Minis

MINNEAPOLIS – Custom Systems, Inc. (CSI) has a multiport communications interface for Data General Corp. and Digital Computer Controls, Inc. minicomputers.

The multiplexer and all necessary control logic are contained on a single printed circuit board available in either four- or eight-channel configurations, according to a CSI spokesman.

A capability allowing a mini to be expanded from a minimum four lines to a maximum 64 lines is included in the unit's control logic; up to eight multiplexer boards can be placed in a CPU, the spokesman added.

Data format and transmission rate are selectable on an individual channel basis through jumper strap options on the circuit board, he said.

Prices for the interface start at $1,250. CSI is at 2415 Annapolis Lane, Minneapolis, Minn. 55441.

Includes Master, Students Keyboards

Digi-Log Adds Modular Teaching System

HORSHAM, Pa. – The On-Line Classroom from Digi-Log Systems, Inc. was designed to interact with a real-time computer system for teaching, problem solving and text manipulation applications.

The teaching terminal system consists of modular components including an interactive keyboard and 12-in. CRT for the instructor and auxiliary keyboards for students. The students' keyboards are controlled from the instructor's master terminal, according to a Digi-Log spokesman.

The master terminal operates on-line to an on-site or remote time-sharing computer system at transmission speeds up to 9,600 bit/sec or 300 bit/sec respectively, he said.

The master terminal is a standard Digi-Log Telecomputer terminal with a built-in acoustic coupler. It has video display drivers for information display on 10 to 15 video display monitors placed up to 1,000 feet from the master terminal in the classroom or lecture hall, the spokesman noted.

The students' keyboards are teletypewriter-like and operate on a time-shared basis with the instructor's terminal; only one student keyboard can be active at a time, he explained.

A switch box control module on the instructor's terminal selects which student terminal will be active, he added.

Communications from the On-Line Classroom can be made to any CPU with dial-up capabilities from the Ascii, asynchronous, dial-up master terminal, Digi-Log said.

The system includes RS-232 and current-loop printer interfaces as standard equipment for links to printers with RS-232 communications capability, the spokesman added.

The printer, not offered by Digi-Log, is used to keep a record of transactions with the time-sharing system, he said.

Assuming the large video display monitors already exist in a school, Digi-Log said, the minimum On-Line Classroom configuration is priced at $2,495 plus $550 for each auxiliary keyboard.

Delivery is 45 days from Digi-Log's headquarters at Babylon Road, Horsham, Pa. 19044.

Bus Provides Unusual Setting

(Continued from Page 21)

Lingo added. Lingo is the associate director of the program.

"It would have been a pain to install connections providing for the connection of two telephone lines. Eyebrows would have been raised," Lingo said.

By using the single full-duplex modem, the Mathmobile can roll up to any school and use it with a single telephone, he said.

The Mathmobile travels to the three schools, – 2-1/2-, 10- and 35 miles away from the math center – every day. Forty selected students in the second and third grades receive what Batten called "a 10-minute exposure to the terminal" by interacting with a drill-and-practice math program housed in the center's CPU.

The Mathmobile is equipped with 200-ft extension cables for electrical power and telephone connections to patch into plugs at the three schools. A telephone handset in the mobile unit allows the driver/instructor to dial the center's telephone number and send all eight terminals' signals down the single line to eight different ports in the 200F CPU.

The Mathmobile's traveling teacher works with students and makes sure they are on their proper level of study within what Batten termed "concept blocks" based on HP educational software programs.

The students, he said, were selected by the school division and are excused from their regular classroom routines for the interactive drill and practice.

There has been a tremendously positive reaction to the program, Batten noted, and the students have achieved good test scores and significant gains in mathematics ability over students in the traditional classrooms.

Batten and Lingo initially wanted Teletype Model 33 keyboard send/receive terminals because of their good experience with about 55 terminals within the counties' schools. Teletype, however, was unable to furnish the center with eight terminals in the timeframe constraint the center specified, Batten said.

Center personnel then turned to GE, although Terminets were virtually untried in the field.

Terminals Pushed Hard

"We put those eight terminals to work in a hurry and GE stood behind us very well on the Terminets. We pushed pretty hard. We're a tiny little consumer and [GE] did a darn good job to help out the little guy," Batten remarked.

He also said the center had worked with the Vadic people in the past and "had confidence in Vadic's ability to problem solve." Batten was "equally impressed with the Timeplex people," he said.

The response time from the Mathmobile to the center, however distant, is no more than 3 sec under loaded conditions but usually less than 1 sec, Lingo said.

The math and science center also utilizes Vadic 307C modems at the front of the CPU and Vadic Model 306A modems interfacing the Teletypes in the field with 32 dial-up telephone lines at speeds up to 300 bit/sec.

Olivetti Has Teleprinter In KSR, ASR Versions

NEW YORK – Olivetti Corp. of America has introduced two models of the TE 400 modular electronic teleprinter system – one an automatic send/receive (ASR) version and the other a keyboard send/receive (KSR) model.

The TE 400 was designed for dedicated or switched networks using five-level Baudot code.

The units feature electronic alphanumeric keyboards which are said to automatically control the shift between upper and lower case characters.

The units also feature as standard equipment high access speeds, 64K-character memory buffers, dot matrix impact printers, integrated line control units to manage operating modes and a control console with visual and acoustic signals, according to a spokesman.

The TE 400 will be available in both versions by the first quarter of 1977, he said, adding a stripped-down TE 400 KSR costs $2,381 while the basic ASR model is priced at $3,089.

A variety of options is available for either model, he said from 500 Park Ave., New York, N.Y. 10022.

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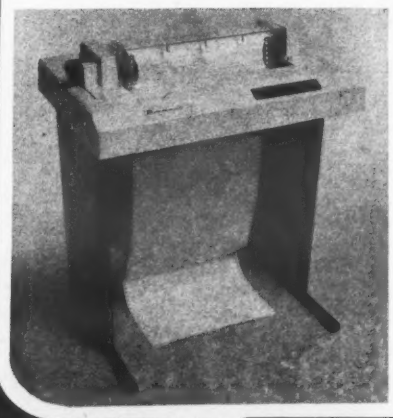

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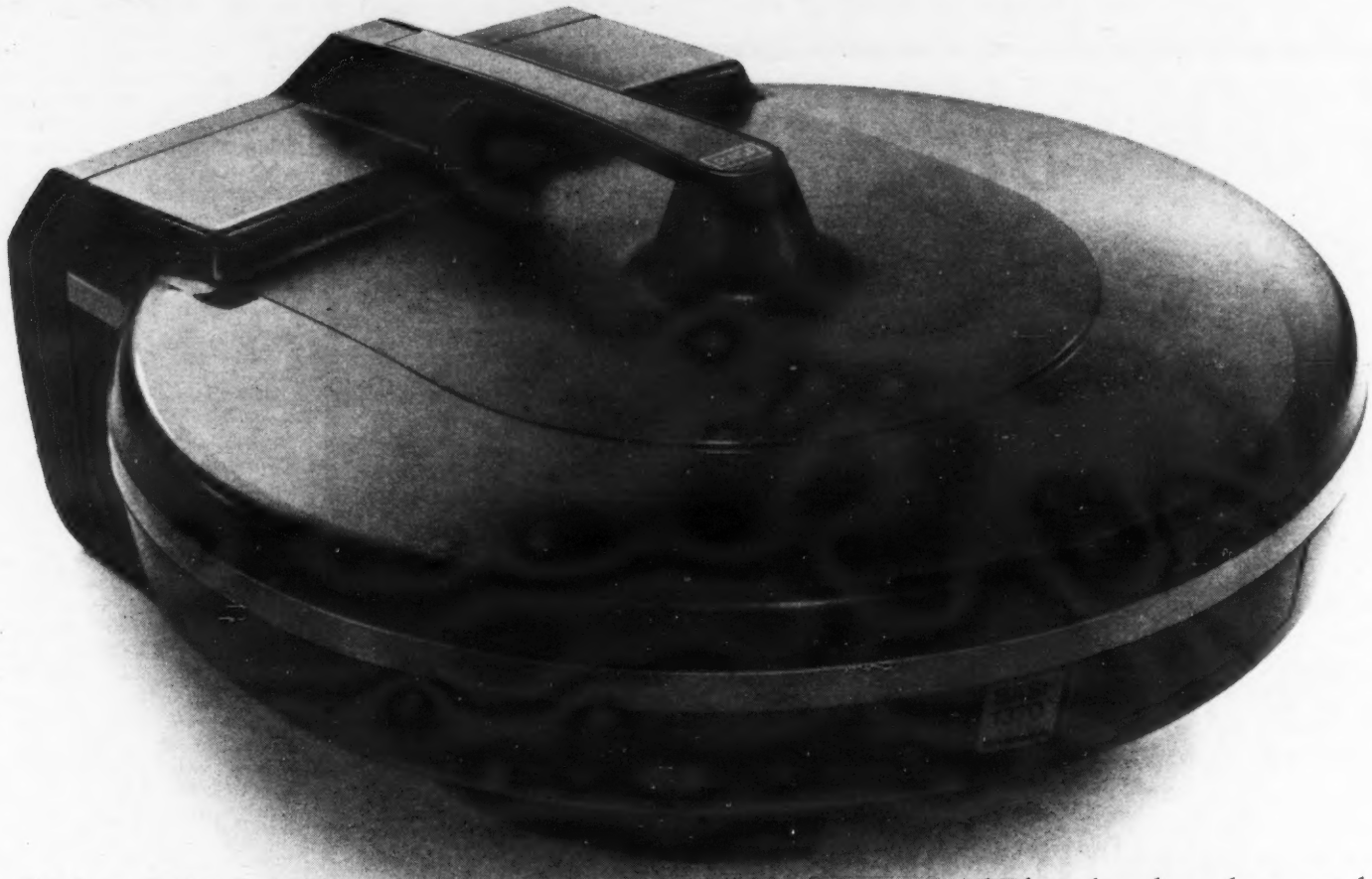

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For complete details on the BASF "Winchester" Data Module, write: BASF Systems, Crosby Drive, Bedford, MA 01730, or call our nearest regional office: in Los Angeles, (213) 451-8781; in Dallas, (214) 233-6607; in Chicago, (312) 343-6618; in Clifton, N.J., (201) 546-9111; in Montreal, (514) 341-5411; and in Toronto, (416) 677-1280.

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Datapoint Introduces Modems, Peripheral Switchers

SAN ANTONIO, Texas – Datapoint Corp. has added two modems and three peripheral switching devices to its product line.

The modems were designed to connect remote user terminals to the Datapoint Datashare business time-sharing system, while the switching devices allow a modem or other peripherals to be shared between two Datapoint processors.

The Model 9408 and Model 9409 modems operate asynchronously over standard dial-up or leased telephone lines; both operate in full-duplex mode, according to a company spokesman.

The main channel of either modem transmits data at 1,200 bit/sec from the Datashare system to a remote terminal's CRT screen; a 150 bit/sec reverse channel carries keyboard-entered data to the system, he said.

The Model 9408 connects to the communications port of the Datashare system, while the 9409 is utilized at the remote terminal, the spokesman noted, adding a Bell-supplied Data Access Arrangement (DAA) is used to connect the modems to the phone lines.

Either model can be leased for $21/mo on a two-year lease or purchased for $790. Metropolitan-area maintenance costs $15/mo with an additional one-time $15 installation charge, according to the company.

Peripheral Switchers

In installations where two Datapoint CPUs are located in close proximity, the Model 9025 peripheral switching device reportedly will connect one peripheral to either of the processors by the activation of a switch.

The Model 9026 switches two peripherals to one processor; the Model 9023 switches a communications adapter or modem between two processors, the spokesman said.

When each processor only occasionally requires the use of a particular device, the switches eliminate the need for recabling between the CPUs, he added.

The models 9025 and 9026 T-bar-type switches allow an I/O device to be switched from one processor to the other or for two peripherals to be switched to the I/O bus of a single processor, he said.

The Model 9023 is said to allow two communications adapters to alternately use a modem or to allow two modems to be alternately accessed by a communications adapter.

The 9023 uses RS-232C wiring and can be utilized with any communications device conforming to that standard, Datapoint said.

Purchase price of the models 9025 and 9026 is $514 each; the Model 9023 switch costs $224, the Datapoint spokesman said from 9725 Datapoint Drive, San Antonio, Texas 78284.

Industry Now in Transition: Doll

(Continued from Page 21)

ment," he said, adding the Bell System traditionally has filed tariffs for the provision of teletypewriters and other widely utilized terminal equipment in the computer services industry.

"Recently, Bell was temporarily prevented by the FCC from offering a CRT display terminal with a microprocessor for interstate applications on the basis the terminal contains the capability for providing DP services.

"In a rare display of harmony, IBM and virtually all of the major suppliers of competitive terminal equipment have joined forces to oppose the Bell System's proposed tariff for offering the CRT terminal, known as the Dataspeed 40.

"Paradoxically, this terminal is already being permitted to operate on interstate networks, but only when it operates in a Teletype emulation mode," he noted.

"Also of major significance is the fact that the same CRT device temporarily banned for interstate communications has been successfully tariffed for intrastate applications in numerous states," he added.

User Dilemma

"One major issue facing users these days is whether to utilize the public, intelligent networks or to construct and operate their own systems. One can easily visualize the evolution of a communications resale industry which effectively provides the retailing function in distributing communications capacity to all users," Doll said.

"An important impact on the computer services industry, however, is the burgeoning impact of intelligent communications networks such as those available from Telenet and Tymnet to allow users and potential customers with different host computer facilities and terminal equipment to freely interconnect with minimal software and hardware conversion requirements."

Doll said the recent availability of such intelligent network services is stimulating the computer services marketplace by bringing together many potential buyers and sellers of application packages and data bases more readily than was possible in the past.

Turning to recent tariff action, he said there have been numerous disturbing trends in local Bell System operating company tariffs that are going to run up the costs for local dial-in services used by service firm customers.

"Throughout the country, the Bell System is implementing a policy of converting to dial network tariffs where even local calls will be tariffed according to their holding times.

"Historically, local call tariffs enabled users to remain connected to the dial network indefinitely since tariffs were structured on a per-call basis rather than on a holding-time-sensitive basis," he explained.

Doll added that his firm has recently seen numerous end-user clients facing increases of 50% to 300% in the cost of local message unit charges, with typical prices for local call connect time ranging from $3 to $5/hour. "This phenomenon will continue to spread around the country," he claimed.

The only way to avoid the increases will be to utilize alternative strategies such as short-distance, leased-line connections or to find ways to share individual communications facilities across a wider variety of user terminals and computers all the way down to the local distribution level, according to Doll.

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Purchase Decision Lets Hospital Cut Costs, Expand Net

LONG BEACH, Calif. – Administrators at the 300-bed Long Beach Community Hospital (LBCH) here said they cut DP costs by more than 50% when they replaced a leased computer and communications terminal system with a purchased system.

The network is comprised of eight terminals and one slave printer in four separate locations. The terminals are linked by either hard-wired connections or in-house dial-up private lines to a multiterminal, multilingual Hewlett-Packard (HP) 3000 system, according to Nancy Riley, LBCH's data systems manager.

The system handles all patient financial recordkeeping, billing, personnel records, general bookkeeping and other administrative tasks as well as pulmonary function analysis and laboratory quality control.

"The computer system has halted increases in the size of our business office," according to Arnold Loveridge, the hospital's associate director. "Hospitals which have gone the route of larger business offices are finding they are still growing with no end in sight."

LBCH is doing the job for the same money and is getting expanded DP and data communications capability at the same time, he added.

Terminal Transactions

The HP 3000 supports five HP 2640A interactive display terminals used in program development and located in the DP center with hard-wired communications to the mainframe, Riley said.

It also supports one HP 2640A in the hospital controller's office operating at 1,200 bit/sec through a Gandalf Data, Inc. modem and an acoustic coupler.

A Lear Siegler, Inc. ADM-3 in the hospital pharmacy and an Asciiscope CRT with a Texas Instruments (TI) slave printer in the respiratory therapy department transmit data at 300 bit/sec to the CPU over private dial-up lines maintained by a private company, Riley said.

The HP system replaced a leased Xerox Sigma 5 CPU with four disk drives, one tape drive and only two terminals. "The $11,000 monthly rental payments for our old system were more than our present purchase payments," Loveridge said. "In three and a half years, we will have our own system."

"It was a question of either expanding core in the old system, which would have involved a significant cost increase, or finding another processor that could handle the job," Riley added.

The HP 3000 performs, for nearly half the cost, essentially the same administrative functions as the larger leased computer it replaced, Loveridge said. However, even more important than dollar savings is the expanded capabilities of the in-house system LBCH now has, he added.

LBCH's computer and terminal network handles nonclinical paperwork associated with hospital operations. Administrative data is sent to the processing center on a regular schedule, keypunched on cards and batch processed by the HP 3000.

Although LBCH programmers utilize the five interactive terminals, often used for data entry, Loveridge has found card data entry is more economical for the hospital's purposes. "Since most of our data is processed only once a day, we have found no benefit to CRT data entry," he said.

"Keypunching is faster and more efficient for our present application. It frees our terminals for programming purposes and real-time calculation," he explained.

Admission and registration forms for all patients, including inpatient, emergency and outpatient, are sent to the data processing center every evening. At midnight, the keypunched cards are read into the system by an HP 2893 card reader and stored on one of two magnetic disks.

Programs update all patient information, produce hard-copy reports on an HP 2618 line printer and then permanently store the results off-line on two 1,600 bit/in. tape drives.

Reports include lists of patients admitted, discharged and transferred. Patient census reports are compiled by nursing station and bed and sent to each nursing station for verification.

Billing Procedure

For billing, an account is opened for each new patient and all charges are recorded daily. Five days after dismissal, the computer produces a detailed listing of all charges, spelling out the date and the amount of each individual service.

Once the bill is paid, the computer sends a follow-up statement to verify the closing of the account. Overdue accounts are taken from the file a month after the first statement; reminders are printed and dispatched by the system on a preprogrammed basis until payment is received.

Another program takes all billing statistics and manipulates them for hospital accounting purposes, keeping track of all account balances and posting payments made.

Accounts payable information is entered into the system once a week. The system writes checks for all invoices to be paid that week while collecting and recording the information for expense distribution for various hospital departments.

At the end of each month, this information, along with data from payroll, purchasing, dietary and maintenance, is transferred into the general ledger. Income and expense statements, budget reports and balance sheets are then prepared by the computer system.

The computer system also keeps track of all of the hospital's fixed equipment and capital assets for cost-accounting purposes.

Payroll maintenance is also the responsibility of LBCH's system. Time card information, once keypunched in, allows the HP 3000 to calculate each employee's wages, make the appropriate deductions, print the checks and charge the appropriate departments for the outlay.

Budgeted man-hour reports as well as overtime exception reports and departmental personnel rosters are by-products of this system. Changes in staff or pay

(Continued on Page 28)

How to increase programmer productivity in a COBOL shop . . . for $30

When you think of it, programmer training is pretty haphazard. After a few language courses, a programmer goes into on-the-job training. Which usually means, he's on his own. So if he ever does learn to write efficient, easy-to-read, easy-to-maintain programs, it's largely through his own doing.

A few weeks ago, for example, I looked through the listings of several COBOL programs written by a senior programmer in a medium-sized System/360 installation. To my surprise, the programs were poorly written. They were written in an almost impossible to understand style; there was no structure to the programs; and there were many inefficient coding practices throughout.

My consultant friend tells me that this isn't unusual at all. In addition, he says all too many COBOL programmers are ineffective when it comes to testing and debugging. And they are dreadfully slow when they have to write unfamiliar routines.

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First, we have a COBOL book that is a programmer's guide extraordinaire. Because it illustrates and explains all the major types of routines that an applications programmer is likely to write, it can save hours of research time. Not to mention coding, compiling, and debugging time.

Second, our COBOL book gives detailed procedures for testing and debugging. So a programmer can use it as a guide to efficiency in this critical area.

Third, we have two assembler language books (one for DOS, one for OS). These books are so effective that hundreds of programmers have learned BAL from them without any outside assistance. So if you have programmers that can't debug by using assembler language output, one of these books is a must.

Fourth, both our assembler language and COBOL books are loaded with down-to-earth, practical, real-world advice. It's like being able to talk to the lead programmer without interrupting his work. As a result, our books can provide job enrichment at the same time they increase programmer productivity.

Who These Books Are For

Although thousands of companies have bought our books for inhouse training, we believe they're equally good as programmers' guides.

In fact, we believe every System/360-370 installation can profit by having at least one copy of the appropriate assembler language book along with one COBOL book. At $30 for the pair, you don't need much programmer improvement to justify this investment. And in most shops, there's so much to gain.

For instance, the COBOL book covers subjects such as: how to design programs so they are easy to debug and maintain; how to use INSPECT and EXAMINE for isolating free-form input fields; how to improve coding efficiency by using the source statement library; how to improve processing efficiency by using SET and SEARCH for table handling; how to write and call subprograms; how to create and process indexed files; and how to use relative files for special file handling situations. This book covers DOS and OS considerations as well as 1968 and 1974 ANSI standards. Its only major omissions are sort, segmentation, and report writer.

As for the assembler language books, they include subjects like: how to write a subprogram that can be linked to a COBOL program; how to write a routine for bit manipulation or code translation when COBOL is inefficient; how and when to use assembler language for processing ISAM or direct files. And always, these books give that extra level of understanding that can turn an average programmer into an outstanding one.

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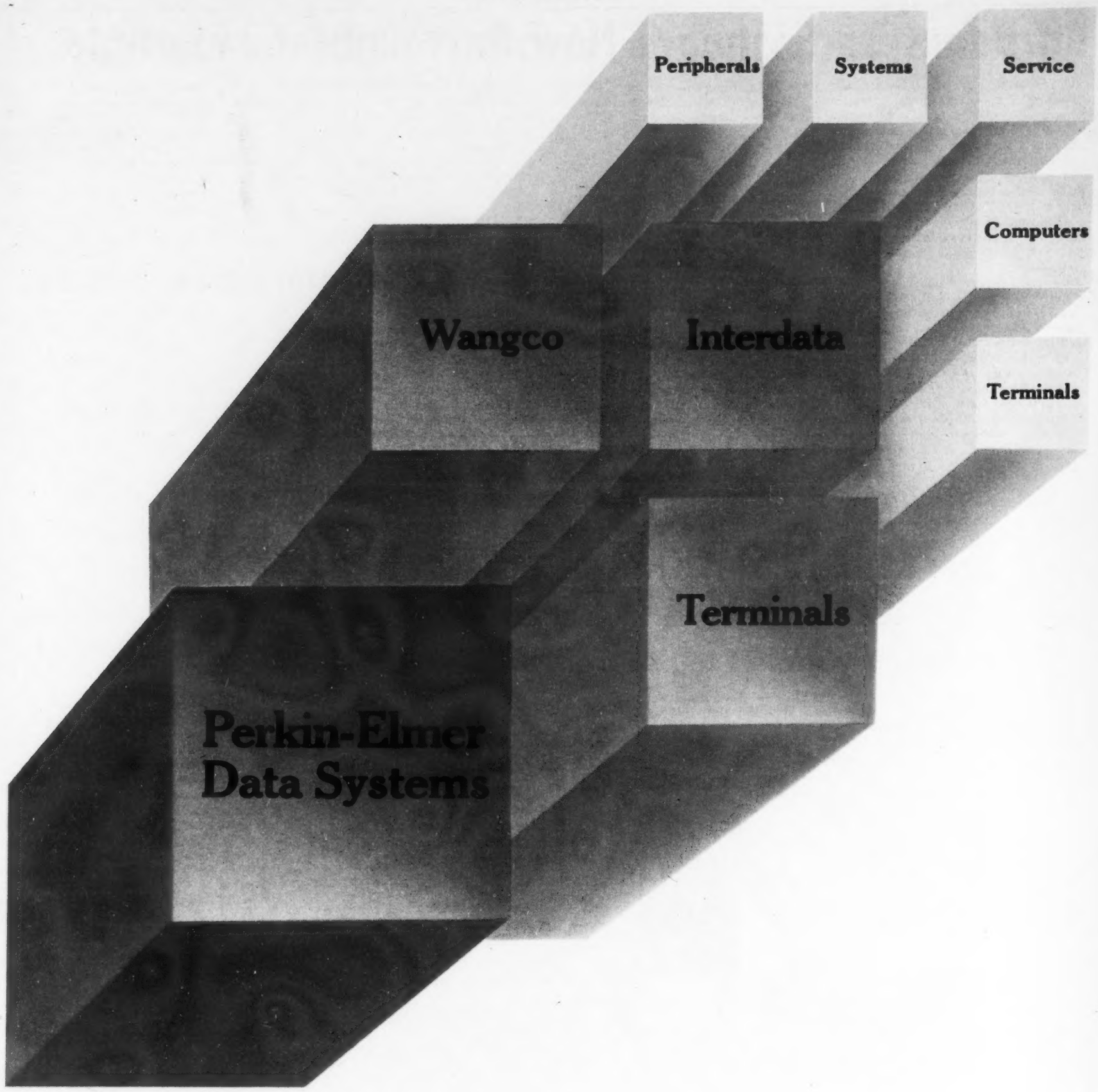

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BR Banktran Software Now Burroughs-Compatible

TRUMBULL, Conn. – Bunker Ramo Corp. (BR) has made its Bank Control System 90 Banktran software compatible with Burroughs Corp. mainframes and has also added a passbook validation/journal printer to the System 90.

In its Burroughs-compatible mode, the System 90 appears to the host CPU as a cluster of display terminals operating on a multidropped synchronous or asynchronous communication line at speeds up to 4,800 bit/sec, according to a BR spokesman.

Burroughs' standard poll/select line procedures for its TD 700, 800 and 820 display terminal series are supported by Banktran in a polled environment, he added.

These procedures include specific poll to a single terminal for the TD 700, group poll for logically related terminals for the TD 800 and, for the TD 820, fast and broadcast select features which reduce the amount of time necessary to write host data to one or several screens, the spokesman noted.

BR's Bank Control System 90 branch administrative terminals support many Burroughs terminal keyboard operational features, including blanking, blinking, intensification, forms mode, tab stops and special editing functions, BR said.

The task of configuring, modifying and down-line loading an operational System 90 from the Burroughs mainframe into the BR branch processor is handled by BR's host-resident Program Support Package (PSP) provided with the System 90, the company said.

Availability of the Burroughs compatibility for the System 90 is scheduled for the second quarter of 1977. The software is bundled in the price of the System 90, the spokesman noted, but he would not quote prices for the system.

The Model 90/86 passbook validation/journal printer for the System 90 performs all on-line teller station documentation functions, the company claimed.

In addition to either dedicated or shared-use capability at the bank teller window, the printer may be shared by several tellers as a back-counter device with a multiteller option, the spokesman noted.

The printer prints up to 96 char./line on inserted documents and 40 char./line on the integral two-part journal roll, he said.

Dot matrix impact printing is said to be performed bidirectionally. All alphanumeric characters and special symbols may be printed in single or double width, the spokesman added.

BR spokesmen also refused to give prices for the Model 90/86 printer.

The company is located at 35 Nutmeg Drive, Trumbull, Conn. 06609.

MI² Adds Interactive Printers

COLUMBUS, Ohio – MI² Corp. has introduced two versions of an interactive printer terminal with switch-selectable half- and full-duplex operation.

The Design 2400 keyboard send/receive (KSR) terminal is capable of character-by-character operation at speeds from 300- to 1,200 bit/sec, as is its receive-only (RO) version; both terminals can print at speeds to 180 char./sec, according to a company spokesman.

The KSR version comes with an RS-232C interface and a 320-character buffer based on a Fairchild Semiconductor hard-wired 64- by 8-bit word random-access memory chip, he said.

Communications flexibility is said to be enhanced by an optional programmable protocol interface board which incorporates an Intel 8080 microprocessor. The micro can be factory- or user-programmed to meet multiterminal demands, he said.

Data can be transmitted from the Design 2400 KSR at speeds of 75- to 9,600 bit/sec in half- or full-duplex and echoplex modes, he added.

Both printers can accommodate up to 158 print columns and have dual six-pin tractors adjustable for paper widths up to 15-1/2 in., the firm said.

In addition, the KSR unit features a 128-character Ascii keyboard with a 12-key numeric pad for data entry formats; automatic bidirectional printing through utilization of the 320-character optional buffer; and standard or elongated matrix characters in 4 by 7, 5 by 7 or 7 by 9 dot format, the spokesman noted.

The Design 2400 KSR model is priced at $4,440; the RO version costs $3,295. An RS-232C interface option for the RO version costs $200.

No price has been set for the microprocessor-based programmable interface option, the spokesman said from 1212 Kinnear Road, Columbus, Ohio 43212.

Terminal Transactions

Hospital Cuts Costs And Expands Network

(Continued from Page 26)

scale are input every two weeks to update the employee data base.

The computer and terminal system additionally handles the problem of monthly nursing schedules. Individual preferences are entered into the CPU and then shuffled to make sure that each shift is covered with a minimum of personal inconvenience. Daily staffing reports ease the job of keeping track of personnel on duty.

More on-line terminal access has resulted in greater opportunities for real-time scientific computation and evaluation, Loveridge said. LBCH medical technologists are now using the terminals to speed their analyses.

A remote terminal in the respiratory therapy department ties directly into the system via telephone lines for a variety of pulmonary function calculations.

The results of spirograms, blood gas analyses and even cardiology evaluations of left ventricular function are evaluated by the CPU and printed at the terminal in a matter of seconds, a process that used to take hours.

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User Attaches Memorex Disk Drives to Amdahl 470V/6

By John P. Hebert
Of the CW Staff

BIRMINGHAM, Ala. – The ninth user of an Amdahl 470V/6 is also reportedly the first such user to attach Memorex Corp. Model 3670 and 3675 disk storage drives to a 470 CPU.

Liberty National Life Insurance Co. here not only experienced a smooth installation of the 100M- and 200M-byte Memorex disk drives on the Amdahl machine, but is saving about $5,000 every month by not upgrading its previous mixture of IBM disks to IBM 3330s.

The company's life insurance policies in force grew 24% to $8.3 billion during 1975. Because of the rapidly increasing activity required of its data center, expansion of processing capacity and off-line storage became necessary, according to John Lovin, vice-president and DP director.

Liberty's 1.5M-byte IBM 370/155 was replaced by the Amdahl 470 because the 155 wouldn't have been able to handle the increased applications the company planned for future implementation, Lovin said.

The 370/155 was loaded to its limits with 2.4G bytes of off-line Memorex and IBM disk storage, he noted.

'Casual Look'

Liberty "looked at Amdahl casually for about a year" while studying the alternatives of upgrading to either two 370/158s in an MVS environment or one water-cooled 370/168 CPU, Lovin recalled.

The choices were narrowed down to the 470 and the 370/168; after Liberty discovered it would be unable to get delivery on the IBM mainframe in the timeframe required, the company turned to Amdahl.

Amdahl proposed that Liberty personnel visit some 470 installations and Amdahl headquarters. After seeing the sites, Lovin felt the 470 would provide the needed power and handle the processing load; it was also a better price, he added.

"We saved $300,000 in the initial purchase price over a 370/168 and well over $100,000 in physical upgrades" which would have been necessary for the installation of the water-cooled 168, he said.

These changes to the computer room would have included installing water chillers and upgrading the DP center's air-conditioning equipment, he noted.

IBM Drives Returned

When it came time for Liberty to increase the off-line storage on the Amdahl machine, Liberty found it could save money by returning its eight IBM 2314 disk drives with eight 200M-byte spindles and eight spindles of IBM 3330 single-density disk drives with 800M bytes of storage to a third-party lessor, according to Robert Clayton, operations manager for Liberty.

Liberty then turned to Memorex for one 3675 disk drive with eight spindles and 1.6G bytes of storage – which cost the same as the previous 1G bytes of IBM disk storage, he said.

The present configuration includes the 2M-byte 470V/6 CPU, four user-owned IBM 3330s, four Memorex 3675s and three Memorex 3670 disk drive modules amounting to 3G bytes of off-line storage – 600M bytes more than the 370/155 configuration allowed, Clayton said.

The entire Memorex equipment configuration consists of four 3675 disk drive modules and one 3673 disk controller connected to one block multiplexer channel via a Memorex 3672 storage control unit (SCU).

A second string of Memorex drives consists of three 3670s connected to a separate channel via the SCU.

The SCU allows expansion by adding up to four 3673 disk controllers with optional string switching. Each 3673 can control up to four 3670/3675 drive modules. A total of 32 drives, or 6.4G bytes, is accessible on one channel, Clayton explained.

Throughput Up 600%

The Amdahl CPU has brought an increase in throughput of approximately 600%, Clayton claimed, because of its faster cycle time of 32 nsec, coupled with the 27 msec average access time and 806 kbyte/sec transfer rate offered with the Memorex drives.

In addition, the CPU allows the use of more channels for peripheral attachment, he noted.

The initial Amdahl installation emulated the 370/155's four-channel operation. To take advantage of the 16 channels available on the 470, several minor changes were made in the operating system (MVT 21.8), he said.

Additional coding was incorporated within the operating system to accommodate machine and channel check handling

(Continued on Page 35)

Burroughs System Encodes Micr, OCR

DETROIT – Burroughs Corp. has introduced the S 500 Document Management System which it said provides banking, commercial and governmental organizations with a choice of system capabilities in preparing documents for electronic

Burroughs S 500

reading by other machines in data entry applications.

The S 500, a single-pocket encoder, features an electronic keyboard and programmable code line, Burroughs said. It can encode documents in either magnetic ink character recognition (Micr) or optical character recognition (OCR) type fonts.

The primary Micr use of the system will be in proof of deposit operations which prepare Micr-encoded documents for processing, according to a company spokesman. The system will also be applied to proof and receipting operations involving OCR-encoded utility bills, insurance premium notices, credit card slips and loan coupons, he said.

The S 500 utilizes programmable read-only memory (Prom); this provides the unit with a fully programmed Micr/OCR code line with one to eight fields. Once identified and defined, the Prom program sequences the encoding operation automatically, Burroughs said.

Documents which pass through the system are visible at all times. Encoding and audit trail printing occur in parallel and the last printed line on the audit tape is visible to the operator, the spokesman added.

Communications lights take the operator step by step through the encoding operation. An electronically buffered, standard 10-key keyboard stores both numeric and control information for up to 21 print positions, he said.

Fields are encoded in a controlled index sequence on the S 500. Exception item encoding as well as normal proof of deposit encoding is available by selecting the field keys only for fields to be encoded outside the sequence; no program changes are required, Burroughs said.

Documents are transported through the encoder at 75 in./sec. Combined with the S 500 audit tape lister which prints at 2.5 line/sec, the S 500 can encode a 10-character amount field at 60 document/min.

Options available include check digit generation, check digit verification, index capacity checking and productivity counters.

The S 500 costs $7,450 and leases for $215/mo on a three-year contract.

Israeli Firm Saving Disk by 'Hiding' Files on Tape

By Alex Ragen
Special to Computerworld

JERUSALEM, Israel – By "hiding" infrequently used disk files on tapes without the owners' knowledge, the Office Mechanization Center (OMC) here has slashed its ballooning requirements for more disk space.

A service bureau for most of Israel's government agencies, OMC has grown in eight years from a modest IBM 1401 installation to a 2M-byte 370/168 shop supporting two remote job entry terminals as well as dozens of Time Sharing Option (TSO) users all over the country.

In addition, the system supports on-line telecommunications to Ben Gurion Airport customs officials.

Since the installation of TSO two years ago, the demand for additional disk storage capacity has far outstripped the supply. Management's first reaction was simply to order more drives, but users' appetites for disk space were stimulated rather than satiated by increasing the supply.

Now OMC periodically removes low-use files from the crowded disks and transfers them to tapes (it has 8,000 in its library). A specially written routine linked with the VS2 OPEN SVC restores such files to disk as they are requested.

The entire system is transparent to the user, who ordinarily does not know whether his files are on disk or tape.

Changes were also made in the FORMAT 1 DSCB which allow the system to keep track of file usage and to determine whether the tape version of a file is identical to the disk version in order to minimize unnecessary copying.

After a year of operation, the method is considered a huge success. It won the Data Processing Systems Prize of the Information Processing Association of Israel last year.

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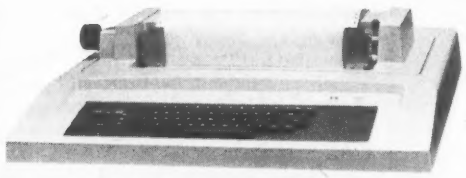

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Van Line Moves to Key-to-Disk, Cuts Error Rate 90%

ST. LOUIS – United Van Lines lowered its error rate on freight bills by 90% after switching from keypunch machines to a key-to-disk data entry system, according to the user.

The system also allowed the moving company to increase its data entry throughput by at least 30% while lowering costs at the same time, according to Elinor Sirota, manager of computer and technical services.

United Van Lines is saving approximately $300/mo on equipment costs alone after replacing six IBM Model 029 keypunch machines and four verifiers with an Inforex 1303 and nine keystations, she estimated.

In addition, the firm is saving $3,000 each year on punch card costs and approximately $200/mo on overtime charges for a card reader, she said.

"We had 13 people on our data entry staff when we first installed the system four years ago," Sirota recalled. "Now we have 14 people, but in those four years our revenues have increased by about 30%.

"Where we had processed an average of 500 to 600 freight bills daily, we are now processing closer to 800 freight bills – a total of more than 300,000 records every month.

"If we still used keypunch machines, we would have needed at least 20 people in data entry to handle that increased workload," she said.

The major application for the company's data entry system is revenue distribution for the domestic division, which operates United's household goods moving business.

Freight bills entered on the key-to-disk system prior to processing on an IBM 370/145 contain information on all charges relating to a particular move. From that document, the mainframe determines how revenue from each move will be distributed among United and each of its agents involved with that move.

The key-to-disk system is also involved in revenue distribution for United's flatbed division, its electronics division and its international department. In addition, it is used in processing bills for freight other than household goods, for entering information from drivers' logs and for all data entry relating to the company's general accounting.

United began to explore alternatives to the keypunch machines it had been using because they did not have a sufficient number of program levels to accommodate the amount of information United needed to enter, Sirota said.

"We were outgrowing the three program levels we had available, and it would have been cumbersome for us to key our information within the constraints of those levels," she explained.

"We might have had to use different program drums, split a billing sheet between two keypunch operators or even break up the billing sheet into separate sheets to get all of our information entered in such a way that the computer could access it and prepare all of the vouchers and other documents we require."

Keypunch supervisor May Johnson explained that in the principal application – household goods revenue distribution – keystation operators can now enter data in any of seven records within one of eight program levels.

The software is written so the operator must enter data pertinent to each record in sequence, and Johnson noted United Van Lines' billing sheets have recently been reprinted to coincide with that record arrangement, making it easier to train new operators.

Experienced keypunch operators were proficient on the systems about a week after installation, she added.

Busy Season

During the summer months, the beginning of United's busiest season, as many as 1,200 billing sheets arrive in the data entry room each afternoon.

"The information on those billing sheets is very inclusive," Johnson said. "It spells out things like how many flights of stairs are involved, connecting and disconnecting appliances by other service people – even special items like pianos."

The key-to-disk equipment allows that information to be entered and, if necessary, corrected more quickly than was possible using keypunch machines, Sirota said.

Because of the way United arranges its data, it can store up to four times the amount of data on disk than previously, reducing the frequency at which data must be dumped from disk to tape.

The average keypunch operator produced approximately 8,000 keystroke/hour compared with 12,000 keystroke/hour for the average 1303 keystation operator, Sirota said.

"Now it takes an operator about one minute to key a freight bill. When we used the keypunch, it took closer to a minute and a half. The key-to-disk system saves us approximately 40 hours of data entry time each month, and most of that was overtime," she added.

The error rate on freight bills using keypunch machines was approximately 1%, Sirota said. Now, with the key-to-disk system, the error rate is less than one-tenth of 1%.

After each operator keys each batch of freight bills, a different operator verifies accuracy by rekeying that same batch. A light flashes each time the verifying operator keys a character different from that keyed by the original operator, she explained.

"We also use the system for balancing in our accounting application, and we are now able to make corrections on the controller without having to use our 370," Sirota noted.

An expanded tape-processing feature on the 1303 allows United to search tapes and update and correct data on tape.

"Another advantage is that we can interrupt a job, then come back to it later. It was a lot easier to lose track of cards if that happened under the old system," Sirota said.

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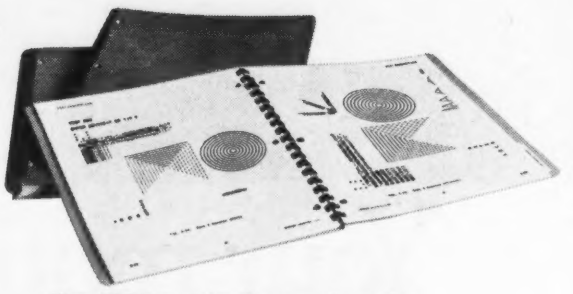

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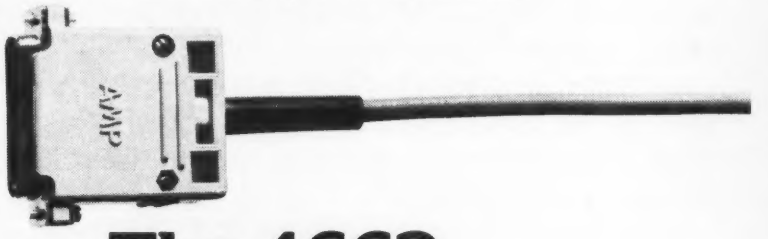

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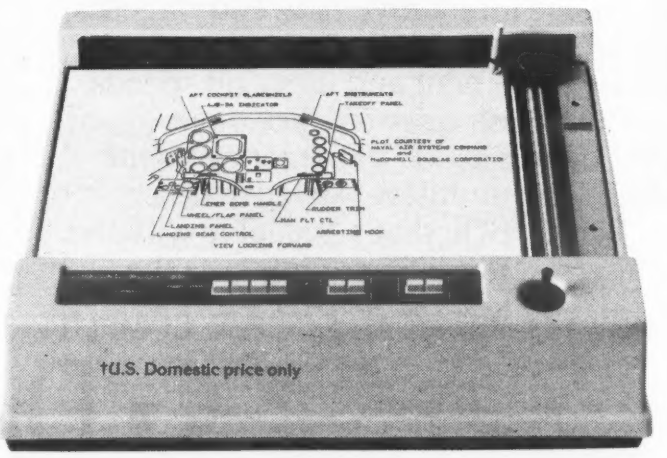

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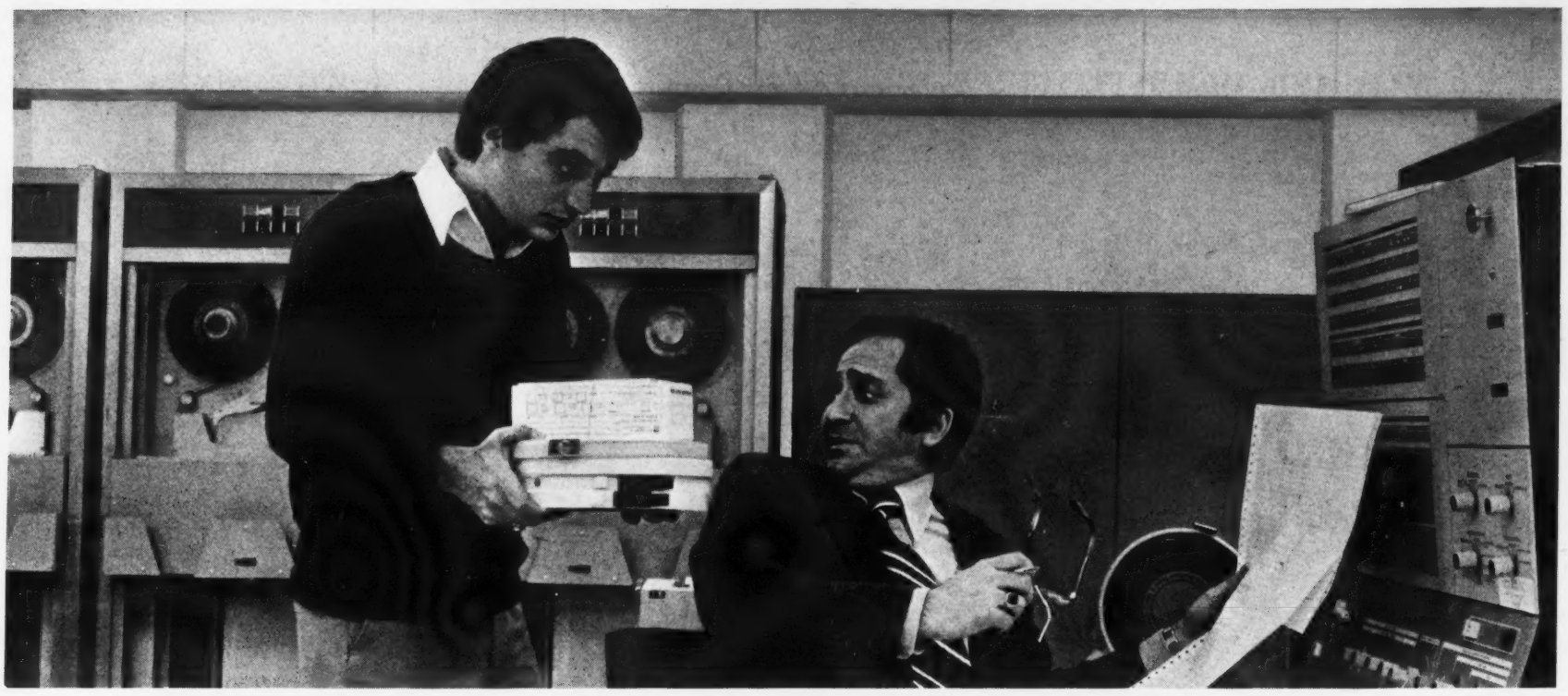

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Single-Frame Unit Uses 16K RAMs

Intel Add-On Expands 370/125 Memory to 1M Byte

SUNNYVALE, Calif. – An add-on memory system which allows IBM 370/125 users to expand 64K bytes of IBM memory to 1M byte has been introduced by the Intel Memory Systems Division of Intel Corp.

The In-7125 single-frame semiconductor memory system uses 16K random-access memories (RAM) to provide a compact storage unit, Intel said.

All specifications of the In-7125 meet or exceed IBM specifications, a spokesman claimed. Its access time of 290 nsec is shorter than that of standard IBM memory and its cycle time of 480 nsec is equal to that of IBM memory, he said.

The Intel memory looks like IBM memory to the Model 125 CPUs, he added. It plugs into the mainframe and requires no changes in CPU operation or user software.

The 16K RAMs reduce the number of storage elements per system by four to 16 times compared with previously used RAMs, Intel said.

Diagnostic Capabilities

The system is compatible with IBM diagnostics and also provides additional Intel diagnostics. It attaches to both the 370/125-1 and 370/125-2.

The In-7125 is said to require less power and air conditioning and is higher in reliability than previous add-ons.

The In-7125 costs $790/mo with maintenance on monthly rental and $720/mo with maintenance on a 48-month lease. The purchase price is $18,900.

First deliveries are scheduled this month, the spokesman noted from 1302 N. Mathilda Ave., Sunnyvale, Calif. 94086.

In-7125 Add-On Memory

Bar-Code Reader Links to CRT

MOUNTLAKE TERRACE, Wash. – A bar-code reader that is said to offer dual connectors to facilitate tandem operation with a CRT or other on-line terminal is available from Interface Mechanisms, Inc. (Intermec).

The dual-connector feature of the Model 9110 allows parallel connection with any on-line RS-232C-equipped terminal, the firm said. Communication between the computer and terminal is transferred through the reader, a spokesman added.

The reader includes the Intermec Ruby Wand light pen for scanning bar-code tags or labels. Suited to production and inventory control data reporting requirements, the reader presently reads Intermec's Code 39, an alphanumeric bar code that features additional human-readable text immediately above the code, and Code 11, a high-density numeric code with a check digit, the company claimed.

Variable-Length Messages

The Model 9110 reads variable-length messages up to 32 characters. The bar code can be bidirectionally scanned at 3- to 25 in./sec with the light pen; an audio signal confirms a correct read, according to the spokesman.

The reader's communications interface is compatible with asynchronous bit serial rates from 110- to 9,600 bit/sec, the company said.

The Model 9110 costs $1,085 from Intermec at 5503 232nd St. S.W., Mountlake Terrace, Wash. 98043.

Memorex Disks Put On Amdahl 470 CPU

(Continued from Page 31)

and to recognize the Amdahl console, he explained.

This console is a minicomputer with an integrated CRT display, contrasted to the previous keyboard console with separate CRT.

Completely Compatible

The 2M-byte 470 is 100% compatible with all of Liberty's previous hardware and software, including Sanders Associates, Inc. Model 804 intelligent batch terminals at 143 remote field offices, 50 IBM 3270 CRT terminals here at company headquarters and an IBM 3705 communications processor, Lovin said.

Another instance of compatibility and throughput power advantages over the previous 370/155, Lovin said, is that the Amdahl machine can handle processing from an IBM 360/20 at a Liberty office in Illinois on a remote job entry basis.

"We didn't have the capacity to do that job before," he said.

Lovin said he was pleased with both the Memorex and Amdahl personnel and with the outcome and cost savings of the installation.

Three Engineers

Maintainability "is the outstanding feature of the Amdahl machine," he added. "If it goes down, we get a rapid response from the three Amdahl on-site engineers. Besides, the machine is designed so it's easy to maintain and trouble-shoot.

"We will be able to process more applications and the DP costs will be less in future years," he said.

COMPUTER MANAGEMENT-
United Kingdom

World rank as DP market: *Fourth*
1975 DP expenditures: *$2.7 Billion*
1975 imports from US: *$270 Million*
Rank as importer from US: *Third*

Computer Management is a monthly magazine recently purchased by Computerworld, Inc. Monthly circulation is 30,000.

COMPUTERWOCHE
Germany

World rank as DP market: *Third*
1975 DP expenditures: *$3.7 Billion*
1975 imports from US: *$274 Million*
Rank as importer from US: *Second*

Computerwoche is a weekly tabloid newspaper started by Computerworld, Inc. It has a circulation of 21,000 to the West German computer community.

SHUKAN COMPUTER
Japan

World rank as DP market: *Second*
1975 DP expenditures: *$4.6 Billion*
1975 imports from US: *$189 Million*
Rank as importer from US: *Fifth*

Shukan is a weekly tabloid newspaper, jointly owned by Computerworld and Dempa publications. Circulation is 35,000.

Zero-Un Informatique
France

World rank as DP market: *Fifth*
1975 DP expenditures: *$2.5 Billion*
1975 imports from US: *$223 Million*
Rank as importer from US: *Fourth*

Computerworld represents **Zero-Un Informatique** in the U S Zero-Un has three publications, one a weekly tabloid newspaper with circulation of 22,000, the second a monthly magazine, circulating 13,000 copies, and a new bi-weekly, Minis and Micros. All circulate throughout Europe's French speaking computer market.

DATANEWS
Brazil

World rank as DP market: *12th*
1975 DP expenditures: *$250 Million*
1975 imports from US: *$60 Million*
Rank as importer from US: *(Est) 10th*

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COMPUTERWORLD
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NBI Preprogrammed Word Processor Works With Diskette Instead of Cards

BOULDER, Colo. – NBI, Inc. has introduced a factory-programmed word-processing system designed as a replacement for magnetic card-type systems.

The NBI System I reportedly features a single diskette capable of storing 50 pages of text in addition to the fixed-format, preprogrammed system software.

It also includes a page-oriented, 1,280-character CRT for display of text in 9 by 16 dot-matrix characters and has a 30 char./sec bidirectional printer, according to an NBI spokesman.

Once material is entered through the IBM Selectric-compatible keyboard, the operator can simultaneously print one document while typing another, he said, adding information stored on the diskette may be instantly accessed for editing purposes.

Other features include automatic carriage return, super- and subscripts, simplified repagination and document assembly capability, NBI said.

An optional extended word-processing package for System I includes automatic centering capabilities, decimal tabulation, stop and switch codes and an electric typewriter mode, the company added.

Purchase price for the System I is $9,900; the extended word-processing option costs an additional $1,300, NBI said from 5595 E. Arapahoe Ave., Boulder, Colo. 80303.

Univac Enhances Accuscan System

BLUE BELL, Pa. – An upgradable key entry system for its Accuscan supermarket checkout system is available from Univac.

The system was designed to minimize store operation disruption if a control center failure occurs, Univac said. It features a modular register that has intelligence and allows the front end to continue operation if the instore mini is down.

The register includes a customized keyboard, 32-character alphanumeric printer, a 5-character numeric display, cash drawer and a combination register stand/control unit, the firm noted.

Optional devices include an 18-character dot matrix display, remote cash drawer, utility drawer for the register stand, electronic scale adapters, coin dispenser adapter and Universal Product Code (UPC) scanner.

The control center may be either a single or dual processing system, Univac said. The single processing system includes the control and a choice of five file storage sizes; a communications adapter or tape cassette unit can be attached to the control center, the firm added.

A basic eight-checkout key entry system costs $42,110 without maintenance. Univac can be reached at P.O. Box 500, Blue Bell, Pa. 19422.

Ampex Adds Memories

EL SEGUNDO, Calif. – Ampex Corp. has a series of core memories that are compatible with the Ampex 1600 series and the Electronic Memories & Magnetics (EMM) Micro 3000.

The 3220 series memories have a capacity of 32K words and are available as either modules or memory systems including card racks, the firm said.

The units have access and cycle times of either 275- and 650 nsec or 290- and 750 nsec and cost about $2,000 in OEM quantities, Ampex said from 200 Nash St., El Segundo, Calif. 90245.

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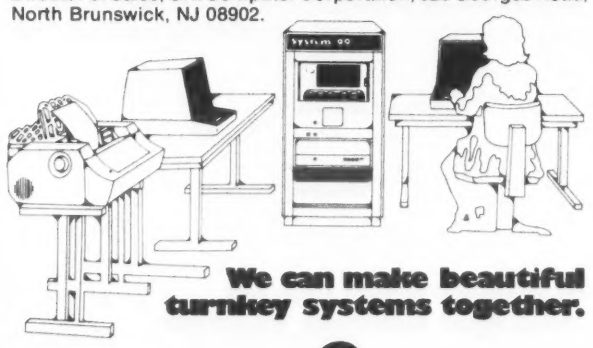

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Birth of Incorporated Micro Forecast

Death of Disk Controller Seen in Mini Memory Future

By Esther Surden
Of the CW Staff

SAN FRANCISCO – Memory products of the future will not only be more reliable and less costly, they won't even look the same, Dr. David George of California Computer Products, Inc. said here last week.

The disk controller will become extinct and, in its place, a bipolar high technology microcomputer built into the disk drive will serve as a controller, George told minicomputer users at the Mini/Micro Conference and Exposition here last week.

"We are entering an era where only the more reliable Winchester-type head will be used," he continued. But because it is difficult to build such a drive with a removable disk, nonremovable media will take over the functions of removable disks, he predicted.

To provide enough storage capacity, the nonremovable disks of the future will need 100M bytes in a single disk; metal film-plated disks with increased reliability and surface properties will also emerge, he forecast.

Faster access time has been achieved, George noted, by placing two heads on each arm. To go beyond this, improvements will have to be made in the design of positioning motors, he said, adding today's more powerful positioning motors already permit access times below 30 msec.

CW at Mini/Micro

When microcomputers are incorporated in a drive, error correction will be easier, George said. It is difficult to test a drive when noise sources exist more often in the cabling than the drive, he added.

With the microcomputer in the disk, there "will be no reason for the system designer to know" buzzwords such as "sectors," "heads" and "disks." All the designer will know is that the disk is a "box that stores files," he said.

The advent of bubble memory and charge-coupled devices (CCD) will also reduce the user's costs, according to Dr. J. Egil Juliussen of Texas Instruments.

A magnetic bubble memory may be accessed by moving the magnetic bubbles to an I/O device while the media remains stationary, Juliussen explained.

CCDs are serial access devices that are packaged on PC boards and feature shift register organization, block-oriented access, bit addressability, volatility and the ability to execute READ, MODIFY and WRITE instructions, he said.

"Essentially anyone who produces metal oxide semiconductors can produce CCDs," Juliussen said.

The first CCD memories were in prototype by 1974 and by 1980 a 256K chip will be available, he predicted.

CCDs could be used as fast auxiliary memory and virtual memory for fast IBM-type storage, he added. They also could be used by minicomputers as a "disk on a board."

Bubble memories, on the other hand, could be used as mini and micro peripherals. The nonvolatile bubble meory has a lower access time than the CCD, which makes it attractive in people-oriented systems, he indicated.

Bubble memory and CCDs will impact users by bringing the total costs of systems down, making memory peripherals match the price of the computer on the board, he said.

Standards Urged

SAN FRANCISCO – Minicomputer disk systems lack the reliability and maintainability of their mainframe counterparts because standards in the "maxi world" are set by companies that sell and support products – and they have to protect their names, according to James Toreson of Microcomputer Systems, Inc.

In the mini world, however, standards "are set by OEM companies who can sell and abandon their products. Wholesale support features are traded for lower price," he told attendees at the Mini/Micro Conference and Exposition here last week.

The disk memory part of the mini world could use standards committees to bring the units up to snuff, he suggested.

Beware of Salespeople Who Promise the Moon

By Jon David
Special to Computerworld

Competitive fixed-price bidding situations have been present in the computer industry since more than one source was available for computing equipment. Although one always likes to have the best value per dollar, in competitive situations it is often necessary to take the lowest bid.

Minicomputer Exchange

Early mini systems, popular in our original aerospace efforts, were almost always "32K" machines. Word sizes were varied, such as 30-, 36- or 48 bits; the number of words, however, seemed to hold to 32K.

In the early days memory was a very, very expensive part of a system. To significantly decrease computer price, one could cut down on memory expense. Since, however, all or at least most systems being considered would have 32K, any system bid with less than that amount of memory might look bad.

To treat such situations, new systems were developed, originally with word sizes of 24 bits.

The systems had many hardware peculiarities and were most frequently delivered with very minimal to nonexistent support programs. To use these systems, one normally had to be adept at both programming and engineering. The buyers of these machines always had long and complex lists of technical questions in both hardware and software areas.

The salespeople of this new breed of machines (now known as minicomputers) were frequently former users and conversant in hardware and software disciplines and the technical applications for which the machines would be used.

It was, at that time, not unknown for the salesperson to be able to take apart and repair a computer, modify or correct system programs and actively help with applications work.

As the power of these systems increased and their price came down, they were considered for end-user commercial situations.

The salesperson selling these business minicomputers typically has no knowledge whatsoever of either computer hardware or software. Moreover, since there are many and varied potential applications areas, the salesperson will be unlikely to have expertise or even thorough knowledge of any particular type of application and frequently does not even

(Continued on Page 39)

MIC Finds Users Unhappy With Vendor Support

By Esther Surden
Of the CW Staff

CHERRY HILL, N.J. – Support, service and maintainability are still thorns in the sides of small business system users, according to a survey by Management Information Corp. (MIC).

More than 200 users with over 300 systems replied to the survey. The users rated the systems on a range of 1 to 4, with 1 equal to "poor" and 4 representing "excellent."

Categories covered were performance, reliability, maintainability, service and manufacturing support.

Of vendors with more than 10 respondees, Burroughs Corp., Hewlett-Packard Co. and IBM scored good or better in all categories.

Datapoint Corp., Digital Equipment Corp. and Honeywell Information Systems, Inc. fell down on service and support, their users said, while Qantel rated an overall good score except for support.

Less than 10 users per vendor was common in the survey. Microdata's Reality, with six users surveyed, was rated good in all categories.

Six for Basic Four

NCR, with seven replies, satisfied its users in every category except manufacturer's support. Basic Four's six users rated support as fair, but the other categories were rated as good.

Olivetti's five users were satisfied with their systems, as were Wang's seven respondees.

Although only three of GRI's System 99 users were identified, the unit was rated good to excellent in all categories. The Lockheed System III was rated excellent by its three users except in the support category.

Minicomputer Systems' Micos was rated excellent in performance, reliability and support, but only fair in maintainability and good in service by two respondees.

The single Prime 300 user who replied rated the system excellent all around.

Over 50% of the users responding use peripherals from independents with satisfactory results, MIC said. Aside from IBM, small business computer manufacturers receiving overall satisfactory rating for their peripherals were Hewlett-Packard and Wang.

Centronics Data Computer Corp. printers, Decision Data Computer Corp. 9600 keypunches, the IBM 5203 printer and IBM 5440 disks were rated good or better by five or more users, MIC noted, but Burroughs users indicated problems in peripherals.

Results of the survey were published in the October "Small Business Computer News," a newsletter available for $51/year from MIC at 140 Barclay Center, Cherry Hill, N.J. 08034.

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Hybrid Disk Drives Seen 'Just Over Horizon' for Minis

By Esther Surden
Of the CW Staff

SAN FRANCISCO – Hybrid disk drives, 6,200 bit/in. magnetic tape drives, solid-state circulating memories and 40M-byte read-only memories (ROM) using film techniques are "just over the horizon," according to Randy Knapp, president of Western Peripherals, Inc.

Speaking at a session at the Mini/Micro Conference and Exposition here recently, Knapp told minicomputer users to give especially careful consideration to their future system needs.

"You may need to install a 50M-byte system now, but you should be aware that expanding this system to 200M- to 300M bytes two years from now could very likely cost you more than you would pay for a new 300M-byte system when the time comes," he cautioned.

Hybrid drives will use IBM 3330/Winchester-type technology for combined moving-head and fixed-head disks. The fixed heads will allow quick access to a limited amount of data; the moving heads will retrieve data from larger capacity storage sections, Knapp said.

The hybrid drives will have a 300M- to 400M-byte capacity per module, he added.

CW at Mini/Micro

Tape drives with 6,250 bit/in. speeds, common on the larger mainframe systems, "should become available very soon for minicomputer users." Within the next several years, he predicted, drives will be available with speeds up to 15,000 bit/in.

Solid-state circulating memories which emulate disks and use existing software will also be available in the next two to three years, he forecast.

A little further off is a development involving 40M-byte ROMs using film techniques, Knapp said.

Mass storage peripherals available to the minicomputer user today often represent the biggest single cost in a total system and sometimes cost more than the computer itself, he noted.

"Even in today's market, 80% of all minicomputer peripherals are supplied by the mainframe manufacturers.

But "virtually any successful independent can supply peripherals that will outperform comparable items from mini manufacturers," he believes.

Today's tape devices include vacuum column and tension arm devices. A tension arm drive operating at 25 in./sec can stop and start in .2 in. without overstressing the tape, but a vacuum column configuration is needed for drives operating at 75- to 250 in./sec, he explained.

"For applications up to 45 in./sec, the tension arm drives have a marked cost advantage and would probably be the configuration most frequently specified," Knapp added.

Two Drive Types

Disk cartridge drives can be classified as either top-loading IBM 5440 types or front-loading IBM 2315 types. The primary consideration in choosing one of these drives is software and media compatibility, he said.

"If your disk system is supplied for a Digital Equipment Corp. PDP-11, is the disk pack used on only one disk drive or must it also be read on another disk system? If so, you are restricted to the 2315-type front-load drive, which is compatible with DEC's RK/05 drive," he said.

"The cost advantage of one-type standardization can be significant because the DP department can pass along volume purchase discounts to other users within the company," Knapp said.

IBM Winchester drives have proven to "be somewhat beyond the means of the average minicomputer user" because their increased density requires use of error-correction codes, making drive-to-computer interfacing more complicated, he said.

Independent peripheral makers have come up with minicomputer disks using Winchester technology but without the error-correction codes, he noted. The barrier "to their widespread use has been the limited availability of software for the mini user."

Minicomputer mainframe manufacturers appear to be on the verge of resolving the software problem, he said, adding those users who need Winchester-type systems now are true pioneers and likely to be "shot and scalped."

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Theodore Kawula, Section Manager, McDonnell Douglas Corporation

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Len Kaiser, Site Manager, COMPU-SERV

Users Should Beware Sales Reps Who Lack Technical Knowledge

(Continued from Page 37)

have a proper vocabulary.

When one speaks to a minicomputer salesperson today, one can expect a "yes" response to all questions. Occasionally, a vendor technical representative with actual knowledge of hardware and software will be called up to supply details.

We have today a situation in which a user is promised the earth, the moon, the sun and the stars by salespeople who in fact have no knowledge of whether the user can get what he has been promised.

They are not engineers; they are not programmers; they are not systems people; they are salespeople, and their job is to get the user to sign on the dotted line and let somebody else worry about getting it to work.

You want order entry? No problem! Ten concurrent users? Sure! Send out 300 invoices per day? We do it every day!

Giving the salesperson the benefit of the doubt, he believes what he tells you to be true. The company has told him it is true and he can see no reason it would lie to him.

He does not, of course, have the technical ability to evaluate the truthfulness of the assertion.

End users are offered contracts which typically provide for full payment only after satisfactory completion, installation and performance of the system. In addition, clauses frequently specify that all or at least most deposit or other monies paid will be returned if the system is not made to work satisfactorily. With such a contract, how can a user go wrong?

Let us assume it takes six months to develop a system after signing the contract. For this period of time a user is spending considerable time working with the vendor and spending money for forms, electrical work and the like.

The system gets delivered, and it only does half of what it was supposed to do. It can, in fact, never be made to do more than that.

If the user throws it out, he has wasted not only six months of time and incurred certain dollar costs, but he has also reached a point in time where he was depending on certain system functions. If he throws it out, everything is on the negative side; if he keeps it, at least he'll have something – a sorely needed "something."

There are countless situations in which systems performing way under contractual commitment have been accepted because they were better than nothing.

David is president of Minicomputer Industry National Interchange (Mini), a professional society treating minicomputers, microcomputers and associated technological techniques, and is also president of Systems RDI.

Readers are urged to reply to this or any other Minicomputer Exchange article. This is your column, a chance for you to exchange views on the various topics confronting the minicomputer user, a chance to tell the vendors what you are thinking and to let your fellow mini users know about pitfalls or new techniques in this area. Letters or manuscripts should be addressed to Minicomputer Exchange, Computerworld, 797 Washington St., Newton, Mass. 02160. Double space, please.

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Computerworld's November 29th issue will include a special report, edited by Ron Frank, on *Data Communications Network Configurations*. The supplement can show you some of the right ways to plan your network -- and how to avoid common pitfalls. In addition to case studies and commentary from well-informed users who understand the data communications environment with all its implications, you'll find applications stories and tutorials on the equipment, carrier services, line protocols, teleprocessing software, etc. that's available to make up your system.

So whether you're building a network or managing one, you'll find important and useful information in the November 29th *Computerworld*. And if you're marketing data communications products or services, you should advertise to your audience here. The ad closing date is November 12th. Talk to your *Computerworld* salesman for complete details. Or call Judy Milford at (617) 965-5800.

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CI Notes

Memorex Denied Injunction On IBM Pricing of Drives

MOSCOW, Idaho – Memorex's preliminary injunction to require IBM to separately price and offer disk drives and disk packs in its 3344 and 3350 product line has been denied by Federal District Judge Ray W. McNichols.

"We are obviously pleased with the decision," an IBM spokesman said.

The 3344 and 3350 products differ from previous equipment in that the disk packs are bolted to the drives and not available separately [CW, Sept. 6].

Memorex, which had contended that pricing the two together violates antitrust law, intends to press the point again when its main antitrust suit against IBM comes to trial next year, according to a company spokesman.

Data 100, Univac Sign Accord

MINNEAPOLIS – Data 100 Corp. has signed a multiyear agreement with Univac to supply line printers for use in a yet to be announced family of business-oriented computer systems for a broad range of applications.

The agreement, which runs through 1979 with an additional two-year option, could reach a value of $15 million.

Under the terms of the agreement, Data 100 will provide volume shipments of 80-, 125- and 250 line/min printers.

DG Moves R&D to North Carolina

SOUTHBORO, Mass. – Data General Corp. (DG) has announced the opening of an advanced R&D center in the Raleigh/Durham (N.C.) Research Triangle.

The company is also exploring manufacturing site locations in North Carolina and other states in line with long-range expansion plans, according to Edson deCastro, president.

The R&D center will initially be devoted to advanced software development activities. A team of less than 10 software development people will be transferred in the near future from the Massachusetts area.

"The Research Triangle area appears ideally suited to such an effort in terms of working and cultural environment, business costs and advanced education institutions and the availability of talented people," deCastro said.

Adapso Unit, Cbema Testify

Industry Groups Condemn Reform Act

By Toni Wiseman
Of the CW Staff

WASHINGTON, D.C. – The Remote Processing Services Section (RPSS) of the Association of Data Processing Service Organizations (Adapso) submitted testimony to the House Subcommittee on Communications opposing the proposed Consumer Communications Reform Act of 1976.

The Computer and Business Equipment Manufacturers Association (Cbema) also presented testimony opposing the Bell-fostered legislation.

The RPSS supports the broadest availability of various types of carrier offerings, with the greatest freedom to innovate, experiment and develop interstate computer communications systems, according to D. Curtis DeForest, president of Calldata Systems, Inc., who represented the Adapso unit.

This, he said, applies both to the availability of carrier offerings and to the ability to interconnect either customer-provided or carrier-provided equipment.

The benefits of competition have been threefold, DeForest said.

"First, competition in the provision of computer communications equipment has encouraged the development of increasingly sophisticated devices which enable more efficient and less costly data transmission.

"Second, competition in the provision of certain common carrier services has led to the development of the innovative data transmission service offerings which are now available from specialized common carriers.

"Third, competition has encouraged the telephone company to upgrade many of its services and to introduce new services and equipment offerings which it did not previously have."

The spread of remote service utilization fostered the growth, if not the birth, of a manufacturing industry to supply the necessary equipment not available from the telephone company, he stated. It also fostered the growth of specialized common carriers to provide transmission services not available from regular carriers.

"The fact that such equipment and specialized transmission services were not available from organizations like AT&T appeared to be attributable to the inability of the well-established, very stable common carrier industry to understand the needs of the remote access data processing industry even though these needs were, in large part, capable of being satisfied by making use of the telephone system for something for which it had not originally been designed," DeForest said.

Recent legislative efforts to confer interconnection standards jurisdiction on the states are "both irrational, since there is an integrated nationwide system, and dangerous to our economy."

Presenting testimony on behalf of Cbema, President Peter F. McCloskey reemphasized his association's opposition to the Reform Act [CW, July 26].

"In basic terms, Cbema opposes the [Reform Act] because [its] strong anti-competitive thrust would, in our view, ill serve the interests of the American public," he said.

On the issue of whether the Federal Communications Commission (FCC) or individual states should formulate interconnection standards, McCloskey noted users who have nationwide operations require a uniform policy so they can use similar equipment in all the states to which their network extends.

A requirement that equipment be built to different standards for different states – or a situation in which some states would permit use of certain equipment with the telephone network and others would not – is fundamentally detrimental to full market development,

(Continued on Page 42)

Amdahl, Fujitsu in Joint Venture To Attack Overseas CPU Market

By Esther Surden
Of the CW Staff

SUNNYVALE, Calif. – Amdahl Corp. is entering into a joint venture with Fujitsu Ltd. of Japan to assemble, market and service Amdahl 470V/6 mainframes first in Europe and later in other areas of the world, Dr. Gene M. Amdahl told a group of security analysts here recently.

In addition, the group was told that Amdahl Corp. has negotiated an agreement with Western Electric and that it hopes to offer an IBM-competitive four-year lease plan.

Amdahl International Ltd. will be owned equally by both companies, Amdahl said. The company already has completed contract negotiations for three systems, two of which are to be installed by December.

The three users are in Germany and Norway, Amdahl added.

"Our biggest problem is being sure we can put in place in Europe the same level of support as we have in this country," he said. To this end, he added, the firm is "in the process of recruiting the proper executives."

Amdahl International plans to establish service and central maintenance facilities and a parts depot in Europe, he said.

The "balance of production capacity this year" has been reserved by customer letters of intent, according to Eugene R. White, Amdahl Corp.'s president.

The firm is shipping about three systems each month, White said. The number that can be shipped is dependent on the number that can get through the limited test facilities, he indicated.

The firm has shipped 15 systems this year, with eight of the systems delivered during the third quarter ended Sept. 24, he added.

The company also announced it has negotiated a general agreement with Western Electric under which Western may, but is not obligated to, buy mainframes from Amdahl.

Shipments to Western Electric, Pacific Northwest Bell Telephone Co. and AT&T Long Lines have already been made under the agreement, White noted, but he would not give the total number of systems involved.

The general health of Amdahl Corp. is good, according to Clifford Madden, vice-president of finance. A public offering in August, conversion of the company's convertible securities and earnings reduced the firm's debt from over $30 million to zero, he said, adding the company has not had to tap its line of credit with Bank of America, Security Pacific Bank and Crocker-National.

Amdahl hopes to arrange an IBM-competitive four-year lease plan for its users,

(Continued on Page 42)

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DG Gives Sweda Marketing Rights to POS System

By Toni Wiseman
Of the CW Staff

SOUTHBORO, Mass. – Data General Corp. (DG) and Sweda International have reached an agreement which will give Sweda exclusive worldwide distribution rights to DG's supermarket system.

Under the terms of the agreement, which extends to 1980, Sweda plans to purchase $40 million in DG products. The agreement covers not only the purchase of the DG supermarket configuration, but also the purchase of minicomputers and peripherals to be used in other retail system configurations.

An industry observer noted this arrangement will greatly benefit the spread of DG's equipment since, to date, there is only one DG installation – at Brockton (Mass.) Public Markets, which helped develop the system.

Sweda, on the other hand, has a proven record of installations, as well as an implemented sales and marketing force for both the supermarket and retail industries, he said.

Sweda plans to combine features of the DG system and Sweda's own supermarket system to produce a complementary system, according to Emilio Fontana, Sweda's vice-president of marketing support.

The agreement covers two aspects, Fontana said. First, Sweda will become the distributor, in a sense, of the DG complete system; second, Sweda's Superscanner and its point-of-sale (POS) terminals will be integrated with the DG backroom equipment and software system.

Sweda initially will offer two systems, but will later consolidate and interface the Sweda terminals and scanner into the DG configuration, he said. Because both configurations already use a DG mini, there is a high degree of commonality between the two, he noted.

The agreement will result in Sweda's offering users a wider variety of configuration options since the two companies' designs and approaches differed.

DG's supermarket offering was totally systems-oriented; a user could not purchase a POS terminal without purchasing the entire system, he said.

Sweda, on the other hand, developed its terminal to have a high degree of stand-alone capability, Fontana said, adding it is in fact sold as a stand-alone to be upgraded later if the user desires.

In upgrades, Sweda has been using DG Novas, 1200s or Digital Computer Controls, Inc.'s DCC-116 as a controller.

As in the case of the terminals, scanners from both companies will be available to users, although Sweda plans to integrate its own scanner "because we believe that from an operational standpoint, from a retailing point of view, it has more benefits than the DG scanner," Fontana said.

He added, however, that the DG scanner has been proven in the two-year field installation at the Brockton Public Markets and will be offered as an alternative.

Amdahl: CCIA Has Far to Go

SUNNYVALE, Calif. – Although the Computer and Communications Industry Association (CCIA) has done a good job of acting as an information gatherer and disseminator and as a "conscience tweaker," the competitive environment has not improved much, according to Dr. Gene Amdahl, chairman of the CCIA and founder and chairman of Amdahl Corp.

"I wouldn't say the competitive situation itself has improved, except vendor awareness, to a certain extent, makes actions by dominant forces perhaps a little more circumspect just because they're aware of much greater concern and the much greater likelihood of observation," he said.

While the CCIA's efforts have resulted in some legislation and certain rulings being enacted, the association's actions have, to date, had very little direct effect, Amdahl said.

The CCIA is concerned with the realities of the competitive environment, namely " 'Do we really have free competition or don't we?'

"Free competition isn't just a philosophy, it's something that has to be able to be executed in practice or it is meaningless," Amdahl said.

"So we are very much concerned about making sure free enterprise is in fact restored to the industry."

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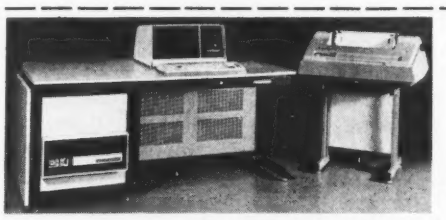

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Adapso Organizes to Fight New York Taxes

NEW YORK – Members of the Association of Data Processing Service Organizations (Adapso) have formed a New York State subcommittee of the group's Tax Committee to counter recently promulgated sales tax regulations on software and DP services.

A new set of New York state regulations, effective last Sept. 1, indicate software and various DP services such as time-sharing are taxable.

User Help Needed

In addition to canvassing software vendors for financial aid, the subcommittee is also soliciting help from users. It has scheduled a meeting here Nov. 15 to discuss plans, according to Dave Campbell, chairman of the subcommittee and vice-president of Computer Task Group (CTG) in Buffalo.

The formation of the subcommittee is one of several efforts by Adapso to help its members cope with various state tax laws, according to Jerry Dreyer, executive vice-president.

Legal Counsel

The association has retained Roberts & Holland, a New York City law firm, to advise it on various tax issues and to act as a resource for its members.

The subcommittee will work with the firm in preparing a position paper similar to that of an amicus curiae brief if CTG goes to court to fight taxation, both retroactive and prospective, on various parts of its sales and services.

Alan Rievman, chairman of Adapso's tax committee and vice-president of National CSS, Inc., acknowledged the effort will cost money and time.

The alternative, however, is to "wait until you have your own battle, but you'll have a decision in the CTG case to act as a precedent," he said.

If a strong case is not made for CTG, the precedent could be damaging to other members, he warned.

Sandy Goldberg of Roberts & Holland recommended vendors begin collecting sales taxes. By doing so they are not condoning the regulations, but merely protecting themselves, he said.

Membership

Among those volunteering for membership on the subcommittee were Campbell; Al Steinhart, president of CRC; Jack Loewenthal, controller of Applied Computer Techniques; A. Werner Pleus, general counsel of Calldata Systems, Inc.; and Robert Singer, corporate attorney of Automatic Data Processing, Inc.

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Adapso Unit, Cbema Oppose Reform Act

(Continued from Page 40)

he stated.

"It is therefore critical that there be a continuance of the established national policy in these areas," McCloskey said. "This can be maintained only if the FCC continues to have the authority to prescribe the basic technical and related criteria."

Competition in the terminal industry must not be stifled, McCloskey emphasized, adding submissions from the FCC and other sources "show the threat of significant increases in residential rates because the use of competitive customer-premise equipment is without warrant.

"It becomes clear there is no need for Congress to help kill or cripple the competitive terminal equipment markets on the mistaken theory this will protect the residential user of telephone service," he said.

"The plain fact is that carriers supporting the [Reform Act] are not satisfied with a large percentage of the projected terminal equipment growth.

"They want more, even if this means crippling existing, working competitive markets – and they think they come closer to this objective through transferring regulatory authority over terminal equipment to the states," he stated.

Amdahl, Fujitsu Plan Joint Venture Abroad

(Continued from Page 40)

White said, but has no plans to offer monthly rental agreements. Amdahl systems are presently purchase-only with third-party leasing available, he added.

With a sufficient number of systems out in the field at present, the company is discontinuing its practice of shipping "100% spares with each shipment," White said, and instead is setting up depot centers for spare parts.

The average availability of systems "is running at 99%," he claimed.

"We have just announced a wholly owned subsidiary in Canada," he added.

In general remarks before the group, Amdahl noted his firm is dedicated to the large system user. "That large user has the largest investment, has the greatest variety of need and thus the largest trauma."

In the process of building its DP staff, the large user has developed the expertise to be able to consider companies other than IBM, Amdahl said.

The recent introduction of the Itel Corp. Advanced Systems [CW, Oct. 18] will have little or no impact on the Amdahl marketplace since the Amdahl mainframe is a more powerful machine, White said.

"We believe some customers will have problems when they look at the residual value of that machine," he told the group. "However, we welcome them into the industry."

The difference between Amdahl and Itel is that "Amdahl started as a total computer company" while Itel is a marketing and leasing organization, White said.

"We do provide total support," he noted, adding the Itel machine uses technology that has been around for a little while but "our technology has yet to be introduced by any others."

"We see acceptance of our product growing greater and greater," Amdahl said, but "we have to control our appetite because we don't want the company to grow except by the acquisition of highly qualified people."

The company is also working on improvements and further products "in terms of a major leap forward" in technology, Amdahl said, and on ways to provide users with additional functions without the need for additional applications software costs.

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CIRCULATION DEPARTMENT

Healthy Signs in First Quarter

Pertec Expecting Good Year After CMC Buy

By Toni Wiseman
Of the CW Staff

CHATSWORTH, Calif. – "Pertec is looking for a relatively good year this year in spite of what the outside world might have thought after the CMC acquisition," according to James R. Grimm, the firm's senior vice-president of finance and administration.

"This reflects the fact that we have quickly turned around a company our size, which had a shaky financial history," he added, noting the first quarter showed healthy signs.

For the quarter ended June 25, Pertec had revenues of $21.2 million compared with $13.4 million in the year-ago period. Earnings totaled $827,000 or 17 cents a share compared with $956,000 or 31 cents for the 1975 quarter.

In terms of overall direction from a financial point of view, Pertec's basic lines are solidly in place, Grimm said. "The firm has sufficient funding to look out into the future, with no amortization of debt until September 1979," he noted.

The acquisition of Icom gave Pertec a new marketplace, "one which we believe has unfathomable growth potential at this time," he said, and the company plans to continue development of its tape and disk lines.

The Business Systems Division (BSD) will soon be announcing new product lines, followed by add-ons to help keep Pertec in the forefront of the data entry market, he said.

"The growth in the market will come from current base expansion and the possibility of new acquisitions," he added.

Not Concerned With Share

Pertec's sales mix is currently a little over 30% from BSD, a little more than 40% from peripherals and about 20% from CMC, a ratio Grimm does not expect to change significantly, if at all, this year.

Pertec is not concerned with market share, Grimm said. "We build a good quality product first and make a reasonable return second, so market share takes a back seat.

"We're stronger than we were one year ago and will continue to grow because we reach the end user now. We cover the business from beginning to end," he stated.

"If we maintain our share in the tape market, we will continue to be a dominant force in that area. We could improve our market share, but gaining market share costs something, often profitability as a percentage of revenues," he said.

Pertec's long-range plans are to overlap the markets it currently serves with one another to take full advantage of its product lines, he said.

"I don't see any major shift in our thrust in the marketplace. Concepts are changing and we will grow in relation to them," he said.

Non-Calculator Business Growth Credited With Wang Expansion

LOWELL, Mass. – Wang Laboratories, Inc. was bursting at the seams until it gained an additional 270,000 square feet by moving its corporate headquarters here recently.

And additional expansion may come soon if the company's current growth rate continues. Wang's computer revenues have leaped from zero to $77 million in the four years since shipments of its 2200 small computer began.

This year – Wang's 25th anniversary in business – has been the best so far; its revenue rate, order rate and the value of its manufactured products each topped $100 million for the first time, according to Dr. An Wang, company founder and president.

Fueling that growth is a major product development effort in processors and peripherals and in word-processing systems, he said.

In March, the company introduced nine computer products, including a system to compete with IBM's 5100; a printer for OEMs as well as end users; a drum plotter; turnkey systems packages for the public accounting and auto parts markets; and a multiprocessor configuration at the high end of the computer line which positioned Wang to compete in the intelligent terminal and distributed processing systems markets.

Three months later, Wang followed with three CRT-based word-processing systems and, in September, the company unwrapped its 2200 VP processor, approximately eight times faster than its predecessor.

Wang is "confident" about his company's future as it enters its second quarter century.

"I am confident for several reasons," he said. "First, there is a growing awareness among computer users that we are now a major supplier of small business computer systems – and no longer only a maker of scientific programmable calculators. Our calculator business accounts now for only about 5% of our revenues.

"Second, applications for small computers are growing in several areas: in word processing and in distributed processing, by 'first-time' customers who are new to the computer industry and for many problem-solving applications, both in the laboratory and in the office."

Noting the 2200 line is sold in each of those markets, Wang said the word-processing series has been very successful since its introduction.

Distributed processing is growing in significance at Wang, he added, and sales are expected to account for nearly 20% of total revenues by the end of its year.

"Our systems and products are being used in three general applications areas in distributed processing – remote batch, remote processing and the upgrading of time-sharing installations," Wang said.

"While our distributed processing customers tend to be the medium to larger sized companies, we are continuing to sell to first-time users and smaller firms as well," he added, "so our large disk-based systems, our diskette systems and our smaller problem-solving systems have all done well.

"In the quarter just ended, all three were over 100% of goal. The large systems finished the quarter close to 200% ahead of their goal."

The 2200 VP should make the high end of the firm's computer line even more competitive, Wang said. "The faster processor allows us to keep ahead of rising user demands for higher speeds and better total performance – and do so without obsoleting any of our other products."

Wang declined to predict revenues or earnings for fiscal 1977, but said "we will be concentrating on additional development in 1977 for both our processors and our peripherals and will be adding interfaces, software packages and other enhancements to our computer product line."

Contracts

Control Data Corp. has received an additional $5 million contract from System Industries, Inc. for storage module drives.

Interdata of Canada, Ltd. has been awarded a contract valued at over $1 million by Systemhouse Ltd. for Model 7/32 computer systems.

Technicon Medical Information Systems Corp. has been awarded a contract by the University of Colorado Medical Center to install and manage a patient information system.

Technicon Medical Information Systems Corp. has been awarded a contract by Methodist Hospital of Indiana to install and manage a medical information system. The award is valued at $5.6 million.

Control Data Corp. has received a $2.3 million contract from the U.S. Army Electronics Command for Phase II of a competitive program to produce a large-scale Interactive Computer Presentation Panel.

Beehive Medical Electronics, Inc. has been awarded a contract to provide Scandia Metric with B100 video display terminals.

AIL, a division of Cutler-Hammer, has received a contract to furnish the Air Force Systems Command with a Programmable Indicator Data Processor system. The contract is valued at over $15 million.

Systems Engineering Laboratories, Inc. has been awarded a contract by Systems Development Corp. for SEL 32/55 computers. The systems are for use under a 34-month contract with the National Oceanic and Atmospheric Administration in development of the ground system for Tiros-N, an advanced weather satellite.

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UK Communications Show Set

LONDON – A Data Communications Equipment Exhibition will be held at the U.S. Trade Center here Jan. 10-14 by the U.S. Department of Commerce.

The UK data communications market, presently estimated at $150 million, is expected to reach $175 million by 1980, according to department figures. Imports presently account for over 90% of domestic consumption with the U.S. share at over half.

The exhibition will emphasize computer peripheral controllers and interface devices, combination I/O devices and processors, input equipment, output devices and parts and accessories of data communications systems.

Further information is available from the Department of Commerce, OIM United Kingdom, Washington, D.C. 20230.

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In California call Carl Tarascio at (714) 631-0181.

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Australians Looking Overseas As Need for DP Workers Booms

SYDNEY, Australia – The demand for computer staff is booming in Australia and wages have soared to levels rivaling those of the U.S., according to *Computer Weekly*, an Australian publication.

This situation is good news for programmers and systems analysts, but is causing grave concern to employers, it noted.

"The potential demand for computing specialists will be five or six times the supply. Growth of personnel in the DP area is remarkable," *Computer Weekly* quoted a DP publication as saying.

"There are now about 11,000 full-time systems and programming staff employed in Australia and, over the next three years, a further 8,200 will be needed."

Because of this demand and the fact that the Australian government has now placed programmers and systems analysts with five or more years of experience in the "national need" category for immigration purposes, Australian employers are looking overseas to hire, *Computer Weekly* noted.

One personnel company, however, found Australian employers prefer DPers from Britain and Ireland "because they fit into [Australia's] lifestyle more readily than do their counterparts from other parts of the world."

Further information on job opportunities is available from American Australian Executive Placement Pty. Ltd., GPO Box 1886, Sydney, NSW 2001, Australia; and Computer Sciences of Australia Pty. Ltd., 460 Pacific Highway, St. Leonards, NSW 2065, Australia.

Questions on immigration requirements should be referred to the Australian embassy in Washington, D.C.

International News

Saudis Plan National Conference

By Peter Fingar
Special to Computerworld

JEDDAH, Saudi Arabia – A third National Computer Conference for the Kingdom of Saudi Arabia is scheduled for Feb. 22-24, 1977 here. The primary objective of the conference is the formation of the Royal Society for Computers and Information Processing (RSCIP).

Although much of this year's conference will be devoted to the formation of the RSCIP, the official theme is "Computers and Development in Saudi Arabia."

Papers are invited on (but not limited to) the topics of manpower selection and development, standards for information processing, guidelines for selecting hardware and software, DP installation planning, Arabic data representation and computers in a manpowershort economy.

Abstracts no longer than one page should be sent to Dr. Amin Kurdi, coordinator, Third National Computer Conference, King Abdulaziz University, Jeddah, Saudi Arabia.

Papers may be written in Arabic or English.

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Performance Evaluation and Improvement

Led by Saul Stimler, author of *Data Processing Systems: Their performance, evaluation, measurement and improvement*, this two-day seminar will give you performance measurement techniques that are *designed* to save your installation money. As well as system performance at your own installation, topics covered include: criteria for quantifying performance, pencil and paper analysis of a system, benchmarking techniques, realtime, batch, and interactive time sharing systems.

Cost for the seminar, including continental breakfasts and luncheons and all course materials is $250.

NEW YORK ... **Hilton** ..... *Nov. 8-9*
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Data Communications Course #1010 — Practical Data Communications Systems & Concepts

Led by Dr. Dixon Doll, the nationally recognized teleprocessing consultant, this two-day seminar will familiarize you with the latest advances in data communications, with emphasis on ways to cut costs. The course covers areas like SDLC, HiD-LoD, DDS, newly approved major revisions to WATS, and the impact of satellite carriers.

Cost for the seminar, including workbook, reference materials, luncheons and continental breakfasts is $350 for the first registrant, and $300 for additional registrants from the same company.

New sites, dates

MIAMI .... **Miami Lakes Inn Country Club** *Nov. 16-17*

Data Communications Course #1020 — Advanced Teleprocessing Systems & Design

Also led by Dr. Dixon Doll, this three day seminar, which is designed as a follow-up to course #1010, will show you techniques that minimize operating costs in commercial data communications networks. The course includes class study and discussion of your own systems, as well as procedures, approaches and algorithms for evaluating and cost-optimizing network operations.

Cost for the seminar, including an extensive set of customized course materials, continental breakfasts and luncheons, is $450 for the first registrant, and $400 for additional registrants from the same company.

MIAMI ... **Holiday Inn Airport Lakes** ... *Nov. 29-Dec. 1*

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MAI Head Sees Minis Growing at Healthy Rate

MONTEREY, Calif. – Just as Americans in the 1960s wanted more horsepower under the hood, the small businessman of the 1970s wants more horsepower from his computer, according to Raymond P. Kurshan.

"We have seen this trend very clearly reflected in our own business," Kurshan, chairman and president of Management Assistance, Inc. (MAI), told a group of stock analysts here recently.

"Our earlier top of the line Basic/Four model could do eight tasks at once. The System 700 we recently introduced can handle 16 different jobs simultaneously and was developed to meet the rapidly growing computer sophistication of small businesses," he said.

Because of this demand for increased DP capability in small- to medium-size businesses, Kurshan predicted the minicomputer market will sustain a healthy growth rate for the foreseeable future.

"MAI's earnings have doubled in each of the last two years, and we see a high rate of growth reflected throughout the industry and holding firm through 1980," he said.

Greater Sophistication

"Interestingly, we've found the small businessman is in many ways more sophisticated than the Fortune 500 firms when it comes to minicomputers," Kurshan observed.

"They are more flexible and more adventuresome in exploring new applications," he said.

"Moreover, big organizations with huge DP centers are often locked into expensive equipment selected and operated by high-priced talent. Most small- to medium-size companies operate with the same – or even smaller – clerical staffs than they had before computerizing.

"And we have found these people will experiment and devise new uses for the equipment because they are not bound by rigid rules and regulations," he said.

Big Users and Minis

In addition to this interest of smaller companies, many larger companies are now devoting attention to the use of small business computers for two primary reasons, according to Kurshan.

The first is a trend toward decentralization, he said. In a company with a number of branches, for example, each manager could have his own computer terminal, making it possible to get information from the computer tailored to his specific needs.

The second is the real-time, on-line function of minicomputers, he said.

In addition to the demand from both small and large firms for increased capability, Kurshan contended the small business system industry will thrive because the minicomputer is the foundation of the much talked about "office of the future."

"Only recently has the business community started to address itself to the problem of what it really costs to operate an office – how much its costs to handle a letter from beginning to end, data storage and retrieval, etc.

"And with postal rates skyrocketing, being able to communicate quickly and inexpensively is becoming critical for many companies," he said.

In explaining the office of the future, he said it would combine data proceessing, word processing and facsimile transmission in one efficient, low-cost network with the minicomputer system as the hub.

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In addition to salary and generous fringe benefits, the compensation package includes participation in the Company's cash and equity bonus plan for management. If you meet the qualifications for this key position, and find the challenge of this growth opportunity appealing, please send resume of experience and salary history to:

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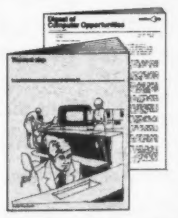

"The Next Step", Source Edp's tenth annual salary survey and career planning guide, is now available. You'll also receive without charge our latest "Digest of Computer Opportunities" describing specific career openings currently available within our client organizations nationwide.

For your free copies of our publications "The Next Step" and "Digest of Computer Opportunities write:
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100 South Wacker Drive
Chicago, Illinois 60606
(P.S. Be sure to use home address and indicate position title.)
Or call your nearest Source Edp Office:
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East: Boston (617/237-3120), New York-New Jersey (201/687-8700), Philadelphia (215/665-1717), Washington, D.C. (703/790-5610).
Midwest: Chicago (312) 782-0857), Cleveland (216/771-2070), Detroit (313/352-6520), Kansas City (816/474-3393), Minneapolis (612/544-3600), St. Louis (314/862-3800).
South & Southwest: Atlanta (404/325-8370), Dallas (214/638-4080), Fort Worth (817/338-9300), Houston (713/626-8705), New Orleans (504/561-6000).
West Coast: Los Angeles (213/386-5500), Irvine, CA. (714/833-1730), Palo Alto (415/328-7155), San Francisco (415/434-2410).

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PROGRAMMER ANALYST
CAROLINAS-$18,000

Major expansion of EDP dept, Fortune 500 mfr located in the Carolinas creates key needs for several prog/analysts. Business & mfg applications in an on-line enviornment. Reqs min 2 yrs ASSEMBLER language exp. (370/DOS/VS/CICS). Excellent benefits and career advancement potential. All fees paid. Contact Jim Schwab at (704) 527-4980 or send resume to:

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FACULTY POSITIONS

The Department of Information Systems Management at the University of Maryland invites applications for faculty positions available Spring 1977 and Fall 1977. A doctoral degree is required. Industrial or government experience is desirable. Candidates should be interested in undergraduate and graduate teaching and may participate in MBA and DBA programs of the College of Business and Management.

The work of the department is interdisciplinary, and its scope ranges over the whole life cycle of computer-based information systems. Areas where additional strength is required- both in teaching and for opening up new areas of research- include management information systems, organizational theory, general systems theory, the design of information systems for major fields (e.g. medical information systems), and the management of the systems development and operation processes.

Send resume including references to:

Edgar H. Sibley
Acting Chairman
Department of Information
Systems Management
University of Maryland
College Park, MD 20742

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Medium sized Hospital and Research Center seeks individual with proven management skills and experience with 370/135. We are developing new accounting and patient information systems utilizing IDMS. Strong project management skills and structured programming experience a definite plus.

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To qualify, you must be able to provide: Hardware/software technical support in real-time, on-line communications oriented systems. "Hands-on" experience with minicomputers, integration of hardware and equipment operations. Designing, evaluation, implementation and maintenance of data communications software, evaluation, selection and installation of computer hardware.

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A well established, Chicago-area based, manufacturer of metal industrial products has a challenging opportunity for an individual with 2-3 years systems analyst background and several years of EDP managerial experience. The candidate will report directly to the President.

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PROGRAMMERS TO $18K
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If you are sincerely interested in pursuing a career in Pittsburgh, send resume (including salary history) to RON PEARCE.

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Responsible for leadership of complex computer project development within specifications of project schedules. Coordinates User Department project management, personnel, education and communication to provide successful installation. Designs, organizes and analizes systems specifications to insure timely and accurate implementation. Recommends and conducts studies to assist management and User Department in determining the impact of new programs and the utilization of resources. Assist the Manager of Systems and Programming in developing formal presentation, proposals and written reports. Designs, codes, implements and maintains support systems.

Xerox Sigma =6E systems. Bachelor's degree preferred. Seven years minimum data processing experience which includes three years programming in a compile level language and two years systems analysis. Must have knowledge of payroll A/R & A/P Programs. $18,528 plus excellent fringe benefits. Send resume to:

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SYST ANAL-prodn control R/T on-line interactive environment, deg req $19-23M

PROG ANAL-learn T-CAM-min. 2 yrs BAL/OS reqd. $17-21M

AUDITOR-Fincl-EDP acctg deg, Big 8, 50% nat'l travel. $19-21.5M

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SYSTEMS

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17-20K

Information system for a publicly funded college in Manhattan requires project leader with 3-4 years of OS experience. You will have complete responsibility for implementing a student system. Experience in working with users and programmers, and writing system specifications essential. Degree required. Excellent fringe benefits and good working environment. One year appointment, with strong possibility of renewal. Send resume to CW Box 4807, 797 Washington St., Newton, Mass. 02160.

SENIOR SYSTEMS ANALYST

The office of Management Information and Computing is seeking a Senior Systems Analyst with B.A. or equivalent in math or business related field. Applicants must have at least five years of D.P. experience, three as a Systems Analyst. Experience in COBOL and IBM/DOS required. Applicants with experience in higher education applications, on-line systems and DBMS preferred. Candidate hired will be involved in development of applications under our integrated database. We offer an excellent benefits package. Salary commensurate with qualifications. Send resume and references no later than November 29th to Box 24D, Waterman Building, University of Vermont, Burlington, Vermont 05401.
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Software Development Engineering

San Francisco Peninsula

Our Software Engineering Department is continuing to grow. Professionals who join us will help expand the state-of-the-art in such areas as MULTI-PROCESSING, MULTI-COMPUTER NETTING, DATA MANAGEMENT, SIGNAL PROCESSING, OPERATING SYSTEMS and REAL-TIME SOFTWARE SYSTEMS.

Currently we have several openings in the following areas:

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Extensive storage and retrieval from large multi-user technical data base. Requires 1-5 years' experience in detailed design and implementation.

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Requires 3-10 years' experience in test plan development, execution and acceptance testing to systems specs.

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Senior level with Univac, UYK-7 experience.

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Diagnostic support software and general software development. Requires 2-10 years' experience.

SOFTWARE TECHNICAL & PROJECT MANAGEMENT
5-10 years' experience performing software systems engineering or task management of 10-30 man real-time intelligence system software development projects.

For confidential consideration, please submit your resume including salary history/requirements to Dept. CW 287, P.O. Box 188, Mt. View, CA 94042. An equal opportunity employer, minorities and females encouraged to apply. U.S. citizenship required.

GTE SYLVANIA

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Massachusetts Institute of Technology

Faculty Position in Computer Aided Design

A new faculty position in Computer Aided Design has been created within The Department of Architecture. Candidates for this opening are invited to submit their resumes and any additional information by December 31, 1976 to:

Professor John Habraken, Head
Department of Architecture
Massachusetts Institute of Technology
77 Massachusetts Ave.
Cambridge, Massachusetts 02139

The position includes 50% research and 50% teaching. The latter entails:

1) An introductory design methods subject at the graduate level, but available to undergraduates.
2) A graduate seminar centered on the candidate's expertise
3) Ph.D. and M.S. Thesis supervision.

Prerequisites include:

1) Ph.D. equivalent in Computer Science
2) Professional degree or experience in design:
   a) art
   b) architecture
   c) graphics or
   d) planning
3) Experience teaching at the college level
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The position can be at either the Assistant or Associate Professor level; salary to be negotiated.

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E.D.P. ACCOUNT MANAGER
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1515 Mechanics Tower
Worcester, MA 01608
(617) 798-0116
Client companies assume all fees

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Dresser Industries, Inc., a worldwide company of highly engineered products and services, has an opportunity for an individual with strong proven analytical skills with its Central Louisiana Operation.

Responsibility will include the formulation and integration of manufacturing, financial and marketing systems concepts.

The analyst should have five years experience involving real time systems using OS, HASP, COBOL, CFMS or INTERCOM.

Forward resumes in confidence to W.E. Wyatt, Dresser Industries, Inc., Box 1430, Alexandria, LA 71301.

DRESSER INDUSTRIES (DRESSER)

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Salary range $14,700-$17,688. The center serves the instructional research and administrative computing needs of a 15,000 student campus. Metropolitan area of Fresno is approximately half million population with easy access to S.F., L.A., and Yosemite and Sequoia National Parks.

Apply before November 15, 1976 to Personnel Office, California State University, Fresno, Calif. 93740 (209) 487-2032.

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FLORIDA INTERNATIONAL UNIVERSITY

Computer Research Specialist (Systems Programmer)
S.E. Regional Data Center
$13,904-$17,304 Annually

Seeking qualified computing professional to provide systems support and development on a Univac 1106. Install and maintain all major system software including telecommunications packages, compilers, processors, utilities, and operating systems. Analyze changes and enhancements to vendor supplied software in relation to data center requirements.

Masters Degree in relevant field plus some systems programming experience, preferably in an academic environment. Please send resume and salary history to Mr. James Helm, Director, Serdac, Florida International University, Tamiami Trail, Miami, Florida 33199.

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SYSTEMS PROGRAMMER

Technically proficient software analyst needed to handle systems maintenance, generation, and application support. Exp. must include OS internals, CICS or IMS helpful. Communications a plus. Degree. $21,000 (fee paid). Contact P. Siegal:

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Assembler Language
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E-SYSTEMS INC.
Memcor Division
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If your field is computer marketing, get to know your Source Edp marketing specialist. Call your nearest Source Edp office this week in confidence.

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South & Southwest: Atlanta (404/325-8370), Dallas (214/638-4080), Fort Worth (817/338-9300), Houston (713/626-8705), New Orleans (504/561-6000).
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Stemmons Tower West
Dallas, Texas 75207
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Electronic Systems Personnel
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Detroit, Michigan 48202
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Data Sciences Personnel, Inc.
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SRA

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Cook Industries

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Please send resume detailing experience and salary requirements to:

Employment Manager
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Equal Opportunity Employer M/F

ASSOCIATE PROGRAMMER

Dynamic Data Services firm providing a management service to the health care industry nationwide has a challenging opportunity for an experienced programmer.

This position requires a minimum of two years experience using COBOL with BAL and RPG knowledge helpful but not required. You must be a self-starter able to work independent of direction and aspire to future management opportunities.

If you meet the minimum requirements and are looking for opportunities for rapid growth financially, educationally, with company advancement and without the traditional fear of layoffs, then consider a career with Computer Consulting Service, Inc. of Dubuque, Iowa.

Send your confidential resume to:

Charles Mills
Personnel Manager
Computer Consulting Service, Inc.
P.O. Box 1278
Dubuque, Iowa 52001

PROGRAMMER

(DL-1)

R.J. Reynolds Industries, Inc., has an opening on its Systems and Programming staff for a Data Processing Programmer. The position will report directly to a Systems Manager, R.J.R.I. Systems and Programming Department.

Applicants should possess the following:

- **Experience in DL-1 Data Base language.**
- **Experience in coding ANS Cobol language in the IBM 370/DOS/VS environment.**
- **Knowledge of the design, test, documentation, implementation, and maintenance of assigned programs.**
- **Familiarity with current available hardware and software technology.**
- **Undergraduate college degree preferable.**

Excellent benefits package, including paid relocation.
Send resume and salary requirements, in confidence, to:

Mr. Denis G. Simon
Corporate Employment Department
R.J. Reynolds Industries, Inc.
401 North Main Street
Winston-Salem, North Carolina 27102

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an equal opportunity employer

EDP DIRECTOR

Exceptional growth company in the Southwestern United States seeks a high achieving EDP Director. The person must be creative, highly competent technically, and a good people manager.

The right person will have a good understanding of the retail industry and will be able to relate to the needs of the user. Operations experience coupled with strong IBM systems and programming management ability are required for this profitable, successful company.

If you believe yourself qualified, please send resume and present salary in confidence to:

Rob Brooks
PROFESSIONALS FOR COMPUTING
Carillon Tower East, Suite 613
Dallas, Texas 75240
Executive Search Consultants

PROGRAMMER/ANALYSTS

SYSTEMS ANALYSTS

Federated Department Stores, Inc., a national leader in retailing, has a major systems development program in progress utilizing advanced application concepts. This program offers ground floor opportunities for professionals in the following positions:

PROGRAMMER/ANALYSTS

- **3 or more years COBOL programming experience**
- **Experience in IMS DB/DC desirable but not essential**
- **Familiarity with Top-Down design and structured programming**
- **Demonstrated design level skills**

SYSTEMS ANALYSTS

- **Thorough and demonstrated expertise in one of the following:**

Retail (preferably department store) Accounts Payable
Personnel/Payroll

- **Contemporary systems design and analysis experience**

Preferably including large systems efforts from startup to implementation

- **Familiarity with HIPO and structured programming techniques**

These positions offer excellent starting salaries and liberal benefits, with the opportunity to play a key role in a multidivision systems development effort, and can lead to further significant career growth.

To explore these exciting opportunities, send your resume including salary history to:

Mr. Frank McKain
Systems Research & Development
Room 504

Federated Department Stores, Inc.

222 W. Seventh Street
Cincinnati, Ohio 45202
All replies held in strict confidence
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DATA PROCESSING DIRECTOR

CAREER POSITION WITH PIMA COUNTY GOVERNMENT located in sunny Tucson, Arizona. Monthly salary range is $1,743 to $2,225. Successful candidate will be responsible for administrative work of unusual difficulty in planning, organizing, developing, and coordinating the overall activities of the Data Processing Department. Minimum qualifications: Any combination of training, education, and experience which demonstrates ability to perform position duties preferably including a bachelor's degree in Computer Science, Business Administration, or acceptable field, and eight (8) years of progressively responsible training and experience including three (3) years of supervisory and managerial experience.

Arizona residency requirement waived for this position. Send resume to Pima County Personnel Department, Health and Welfare Building, 151 West Congress Street, Tucson, Arizona, 85701, no later than 5:00 P.M., November 12, 1976.

Pima County is an Equal Opportunity Employer M/F

SYSTEMS ANALYST

International Marketing Services

We are seeking a person to perform pre-sales activities in the health care market.

To qualify for this career opportunity, you would have 3 - 5 years experience with hospital systems. You would have a BS/Marketing or C/S or equivalent expertise in this field.

Your tasks in this position would be to participate in defining application programs and providing technical support to sales presentations and proposal formulation for health care systems.

To investigate this outstanding opportunity, send your resume to:

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Mr. Vernon L. Mirre
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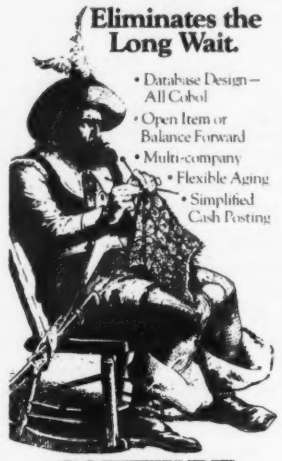

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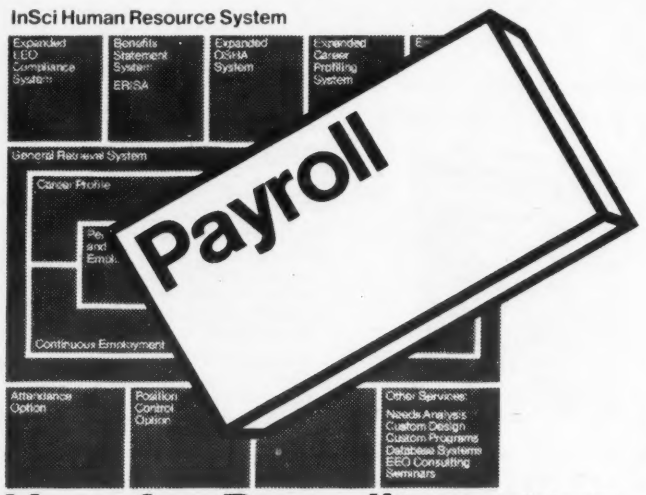

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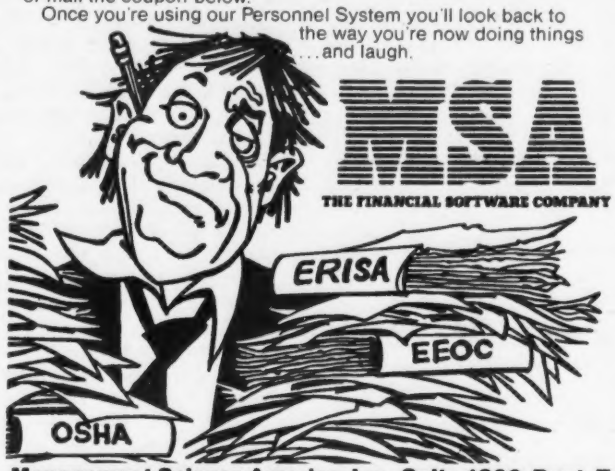

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Quarter Results Also Rise

Honeywell Posts Gains in Nine Months

MINNEAPOLIS – Honeywell, Inc.'s third-quarter and nine-month results were improved over those in the year-ago periods.

Worldwide computer revenues, including those of CII-Honeywell Bull as well as rental and service revenues, were ahead of last year in both periods.

Purchase revenues in the quarter were higher than in 1975's comparable period and about equal to last year's nine-month level, the firm said.

Third-quarter net worldwide bookings in the computer area were substantially ahead of the same 1975 quarter and the second quarter of 1976, the firm said.

Bookings for the nine months also were ahead of those in 1975.

For the third quarter, Honeywell posted earnings of nearly $37 million or $1.70 a share, including a $1.4 million tax credit, compared with $30.8 million or $1.50 a share in the same period last year.

During the recent quarter the firm sustained a $190,000 loss in equity of nonconsolidated companies compared with an $11.7 million credit during the 1975 period that stemmed principally from foreign currency gains, the firm said.

In the same quarter, Honeywell received a $12 million gain from its sale of 19% of its equity in Honeywell Bull. There was no foreign currency gain in the recent quarter compared with $14.3 million in the year-ago period.

Revenues for the quarter totaled $641.4 million compared with $568.9 million in the same period last year.

Computer rental and service revenues rose to $130.8 million from $115.4 million in the year-ago period.

During the nine months, Honeywell's earnings rose to $69.9 million or $3.21 a share compared with $44.6 million or $1.94 a share in the same period last year.

Foreign currency gains during the nine months were $3.8 million in 1976 compared with $6.8 million in 1975.

Revenues rose to $1.8 billion compared with $1.7 billion in the year-ago period. Of these, computer rental and service revenues totaled $379.5 million compared with $343.6 million.

Revenues for 1975 have been restated to reflect the reduced interest by Honeywell in Honeywell Bull-CII. Honeywell's share of the French firm's earnings are now reported on an equity basis instead of on a consolidated basis.

DG Earnings Climb 46% in Year As Revenues Show 49% Increase

SOUTHBORO, Mass. – Data General Corp.'s (DG) earnings for fiscal 1976 jumped 46% while revenues rose 49% over its 1975 results.

Earnings for the year rose to $18.9 million or $1.98 a share compared with $12.8 million or $1.51 a share a year ago.

During the year, revenues climbed to $161.1 million, up from $108.2 million in 1975.

For the fourth quarter, earnings rose 62% to $6.8 million compared with $4.2 million in the year-ago quarter.

Revenues for the quarter rose to $58.4 million compared with $34.6 million in the 1975 fourth quarter.

Edson D. DeCastro, president, recently announced DG had reached a preliminary agreement for the acquisition of Digital Computer Controls, Inc. (DCC). The acquisition is valued at about $11.6 million.

The preliminary agreement calls for a maximum of 303,500 shares of DG common stock to be issued in exchange for shares of DCC. The exact number of DG shares will be determined by a formula based on the average market price of DG stock for a 20-day trading period prior to the effective date of the Registration Statement.

The DCC stock will be valued at $7.50 per share for purposes of the exchange, while the DG stock, in accordance with the proposed formula, is subject to a minimum valuation of $38.40 and a maximum valuation of $57.60 per share.

Depending on the valuation of DG's stock, this would result in an exchange ration of 5.12 shares of DCC for each share of DG or 7.68 shares of DCC for each of DG.

Amdahl Doubles Period Revenues

SUNNYVALE, Calif. – Amdahl Corp. turned in third-quarter earnings of $6.9 million on $26 million in revenues.

The earnings, which include a $3.3 million tax credit, comprise nearly 70% of the nine-month total of nearly $10 million, which included a $4.8 million tax credit.

Revenues for the quarter were nearly double those of the preceding second quarter and about equal to total revenues for the first two quarters, bringing the nine-month total to $52.3 million, the firm said.

In the third quarter, Amdahl installed eight of the 15 470V/6s it has delivered in 1976, according to President Eugene R. White. Amdahl recorded its first revenues in the 1975 fourth quarter.

MDS Results Dip in First Quarter

PARSIPPANY, N.J. – Mohawk Data Sciences Corp.'s (MDS) revenues and earnings both dropped in its first quarter.

The declines were attributed to reduced currency translation gains, rental base reductions resulting from conversion sale activity last year and lower OEM sales.

Earnings for the quarter were $1.4 million or 19 cents a share with translation gains of $3,000. Earnings for the year-ago quarter were $2.1 million or 31 cents a share when translation gains amounted to $1.8 million.

Revenues for the period totaled $38.9 million compared with $41.7 million in the year-ago period.

Discounting the currency gains, however, earnings rose slightly to $3.3 million from $2.2 million a year ago.

Acquisitions

Microdata Corp. has agreed in principle to acquire all outstanding shares of **Computer Technology, Inc.**, a manufacturer of matrix printers.

Insurance Systems of America has acquired all the assets of **Executive Management Software & Services, Inc.**, a marketing firm for multiline property and casualty systems.

Data Card Corp. has agreed to acquire **Rapid Data Systems (Holdings) Ltd.**, a UK company, for $1.4 million.

Baron Data Systems has acquired Information Terminals Corp.'s **Transcripts** product line, a computer-aided transcription system for use by court reporters.

Dictaphone Corp. has agreed to acquire all outstanding **Data Documents, Inc.** common stock for $2.1 million.

Applied Devices Corp. has acquired the balance of outstanding common stock from **Datatrol**, finalizing the merger of Datatrol as a wholly owned subsidiary. Under the terms of the agreement, .18519 share of Applied Devices common stock will be exchanged for each share of Datatrol common.

Tymshare, Inc. has completed arrangements for investment in Sligos S.A. and increased its interest in Cegos-Tymshare. Tymshare purchased an 11% interest in Sligos for about $1.5 million and made a loan of about $1.5 million, which is convertible at Tymshare's option into an additional 9% equity in Cegos-Tymshare to 45% from 20% for about $1.1 million.

The **National Enterprise Board** (NEB) has taken a controlling interest in **Data Recording Instruments Co. Ltd.**, a British computer peripherals firm. The NEB now owns 53.93%.

Nickels & Dimes

Tektronix has raised its semi-annual dividend 25% to 15 cents a share payable Nov. 1 to holders of record Oct. 4.

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Burroughs has declared a dividend of 17 cents a share payable Nov. 8 to holders of record Oct. 8.

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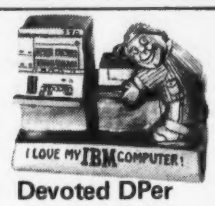

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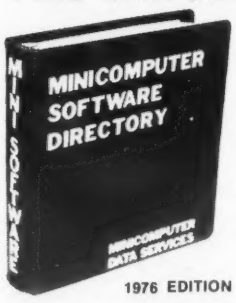

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MISSISSIPPI STATE CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 508 Robert E. Lee Bldg., Jackson, MS 39202, up until 2:00 p.m. 11-15-76 for the following data processing equipment:

Request for Proposal No. 262 for the purchase of an additional 32K words of memory for an existing PDP 11/70 computer system.

Request for Proposal No. 263 for the purchase of a Hewlett-Packard 2112A computer and related equipment.

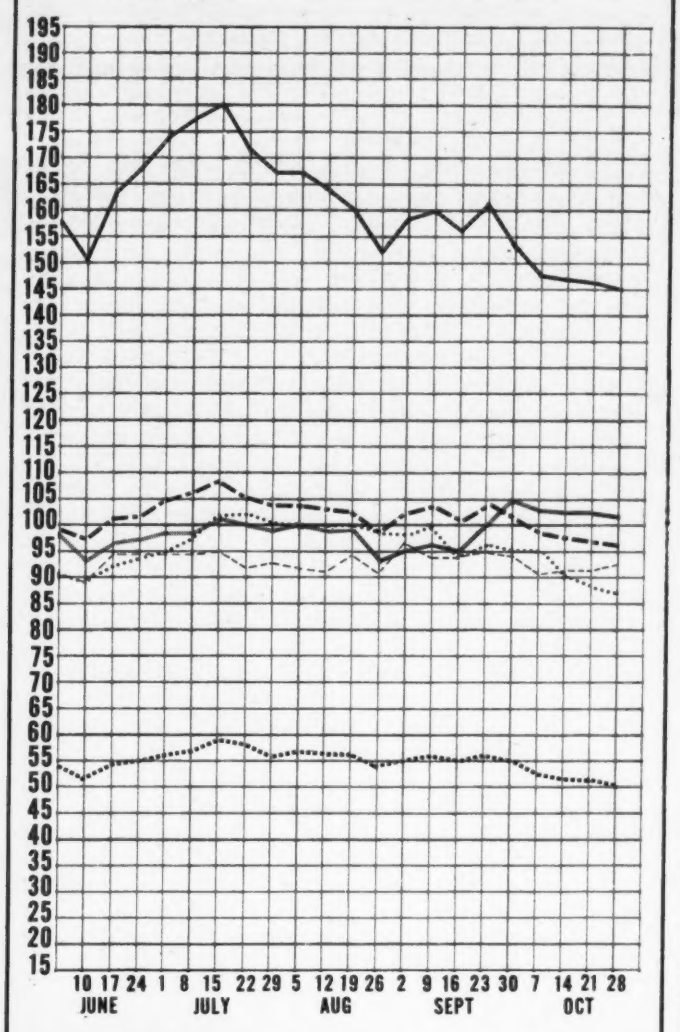
Request for Proposal No. 264 for the purchase of the service for the development, installation, and training of a data center backup and recovery disaster plan for the State of Mississippi.

Request for Proposal No. 265 for the purchase of 2 DEC model DC10B asynchronous communication port expanders to attach to an existing DEC 1077 computer system.

Request for Proposal No. 266 for the purchase of an optical scanning device with EIA RS232C interface, capable of asynchronous communication with a DEC 1077 computer system.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities. Clyde P. Ballard, Executive Director, Central Data Processing Authority.

COMPUTERWORLD Computer Stocks Trading Indexes



Earnings Reports

TELEX
Three Months Ended June 30

	1976	1975
Shr Ernd	$.11	$.19
Revenue	24,602,000	27,508,000
Tax Cred	439,000	635,000
Earnings	1,138,000	1,972,000

TEXAS INSTRUMENTS
Three Months Ended June 30

	1976	1975
Shr Ernd	$.98	$.49
Revenue	392,198,000	330,961,000
Earnings	22,569,000	11,295,000
6 Mo Shr	1.91	1.10
Revenue	761,565,000	663,718,000
Earnings	43,856,000	25,287,000

TRW
Three Months Ended June 30

	1976 (000)	a1975 (000)
Shr Ernd	$1.03	$.84
Revenue	743,800	667,100
Earnings	37,800	28,900
6 Mo Shr	1.75	1.21
Revenue	1,466,300	1,275,900
Earnings	64,300	43,500

a-Restated.

VARIAN ASSOCIATES
Three Months Ended July 2

	1976	1975
Shr Ernd	$.33	$.31
Revenue	87,093,000	79,782,000
Earnings	2,394,000	2,139,000
9 Mo Shr	.88	.80
Revenue	251,210,000	229,364,000
Earnings	6,310,000	5,518,000

VICTOR COMPTOMETER
Three Months Ended June 30

	1976	a1975
Shr Ernd	$.32	.....
bRevenue	55,157,000	$51,482,000
Disc Op	102,000	125,000
Tax Cred	103,000	53,000
Earnings	d1,809,000	(457,000)
6 Mo Shr	.38	.....
bRevenue	103,371,000	94,841,000
Disc Op	175,000	141,000
Tax Cred	166,000	69,000
Earnings	d2,231,000	(2,462,000)

a-Restated to reflect a subsidiary's operations liquidated after sale of its assets on Aug. 31, 1976. b-From continuing operations. d-Includes $733,000 from sale of certain fixed assets.

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TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, OCTOBER 27, 1976

All statistics compiled, computed and formatted by TRADE*QUOTES, INC. Cambridge, Mass. 02139

EXCH		1976 RANGE (1)	CLOSE OCT 27 1976	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	84-108	91 7/8	+2 1/4	+2.5
O	COMPUTER AUTOMATION	10- 19	14 3/4	- 1/4	-1.6
N	CONTROL DATA CORP	18- 27	23	- 3/8	-1.6
N	DATA GENERAL CORP	40- 60	42 7/8	+2	+4.8
O	DATAPOINT CORP	24- 46	27 3/4	+ 1/2	+1.8
O	DIGITAL COMP CONTROL	2- 7	5 1/2	- 5/8	-10.2
N	DIGITAL EQUIPMENT	138-181	150 3/4	+5	+3.4
N	ELECTRONIC ASSOC.	2- 5	2 1/4	- 3/8	-14.2
A	ELECTRONIC ENGINEER.	7- 16	8 5/8	- 5/8	-6.7
N	FOXBORO	28- 50	42 1/4	-2 1/4	-5.0
O	GENERAL AUTOMATION	4- 11	4 1/2	0	0.0
O	GRI COMPUTER CORP	1- 1	3/4	+ 1/8	+20.0
N	HEWLETT-PACKARD CO	80-117	84 1/8	+2 1/4	+2.7
N	HONEYWELL INC	34- 56	44	+ 1/4	+0.5
N	IBM	227-288	266	+2 1/2	+0.9
O	MANAGEMENT ASSIST	1- 3	1 5/8	- 1/8	-10.3
O	MEMOREX	18- 33	21	+ 3/8	+1.8
O	MICRODATA CORP	10- 28	18	-1	-5.2
O	MODULAR COMPUTER SYS	4- 14	3 3/4	- 1/4	-6.2
N	NCR	24- 37	35 1/8	+ 1/2	+1.4
O	PRIME COMPUTER INC	4- 14	12 1/2	+ 1/4	+2.0
N	PERKIN-ELMER	19- 27	20 1/2	- 1/8	-0.6
N	RAYTHEON CO	45- 67	63 1/4	-1 1/8	-1.7
N	SPERRY RAND	40- 52	45 7/8	+ 7/8	+1.9
O	SYCOR INC	11- 31	11 1/4	- 1/2	-4.2
A	SYSTEMS ENG. LABS	6- 10	7	+ 1/4	+3.7
N	VARIAN ASSOCIATES	12- 17	12 3/8	- 1/8	-1.0
A	WANG LABS.	11- 20	14 1/2	+ 1/4	+1.7
	LEASING COMPANIES				
O	COMDISCO INC	3- 10	8 1/2	- 1/4	-2.8
A	COMMERCE GROUP CORP	2- 3	1 7/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 3	1 3/8	- 1/4	-15.3
M	DATRONIC RENTAL	1- 8	7/8	0	0.0
A	DCL INC	1- 1	5/8	0	0.0
N	DPF INC	5- 8	7	+ 3/8	+5.6
N	ITEL	6- 15	12 5/8	0	0.0
N	LEASCO CORP	6- 19	18	+ 1/2	+2.8
O	LEASPAC CORP	0- 1	1/8	0	0.0
O	NRG INC	0- 1	1/8	0	0.0
A	PIONEER TEX CORP	6- 9	7 3/8	+ 1/8	+1.7
N	U.S. LEASING	7- 12	9	+ 3/8	+4.3

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

EXCH		1976 RANGE (1)	CLOSE OCT 27 1976	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 3	1 3/8	- 1/8	-8.3
O	ANACOMP INC	6- 11	7 1/8	- 3/8	-5.0
A	APPLIED DATA RES.	2- 4	3	- 1/4	-7.6
N	AUTOMATIC DATA PROC	17- 35	28	+ 5/8	+2.2
O	COLEMAN AMERICAN COS	2- 6	2 3/8	+ 1/8	+5.5
O	COMPUTER DIMENSIONS	3- 7	5 7/8	+ 1/8	+2.1
O	COMP ELECTION SYSTMS	5- 9	5 1/4	0	0.0
O	COMPUTER HORIZONS	1- 2	1 1/4	0	0.0
O	COMPUTER NETWORK	2- 6	4 1/2	- 1/2	-10.0
N	COMPUTER SCIENCES	4- 8	5 7/8	0	0.0
O	COMPUTER TASK GROUP	1- 2	1 1/2	+ 1/4	+20.0
O	COMPUTER USAGE	3- 6	2 7/8	- 1/4	-8.0
O	COMSHARE	2- 9	4 3/4	+ 1/4	+5.5
O	DATA DIMENSIONS INC	2- 4	2 3/4	0	0.0
O	DATATAB	1- 1	1 3/8	0	0.0
N	ELECTRONIC DATA SYS.	12- 18	15	- 1/2	-3.2
O	INFONATIONAL INC	1- 1	1/8	0	0.0
O	INSYTE CORP	1- 3	1 3/8	- 1/4	-15.3
O	IPS COMPUTER MARKET.	1- 2	1 3/8	+ 1/4	+22.2
O	KEANE ASSOCIATES	2- 4	2 1/2	+ 1/4	+11.1
O	KEYDATA CORP	2- 5	1 3/4	+ 1/8	+7.6
O	LOGICON	3- 4	4	+ 5/8	+18.5
A	MANAGEMENT DATA	1- 3	2	- 1/8	-5.8
A	NATIONAL CSS INC	13- 25	19 3/8	- 1/4	-1.2
A	ON LINE SYSTEMS INC	17- 22	17	- 3/8	-2.1
N	PLANNING RESEARCH	3- 5	3 5/8	+ 1/4	+7.4
O	PROGRAMMING & SYS	1- 1	3/8	0	0.0
O	RAPIDATA INC	2- 5	1 3/4	+ 1/8	+7.6
O	REYNOLDS & REYNOLD	13- 21	15 1/2	+ 1/2	+3.3
O	SCIENTIFIC COMPUTERS	1- 1	7/8	0	0.0
O	TYMSHARE INC	15- 28	15 1/2	-2 1/2	-13.8
A	URS SYSTEMS	3- 5	4 1/8	+ 3/8	+10.0
N	WYLY CORP	2- 7	1 5/8	- 1/8	-7.1
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	8- 13	10	+ 1/8	+1.2
O	ADVANCED MEMORY SYS	4- 10	6 3/8	- 1/4	-3.7
N	AMPEX CORP	5- 10	6 3/4	+ 1/2	+8.0
O	ANDERSON JACOBSON	2- 4	3 1/4	+ 3/8	+13.0
O	APPLIED DIG DATA SYS	13- 25	18 1/2	- 1/2	-2.6
O	BEEHIVE MEDICAL ELEC	3- 9	8 1/4	0	0.0
A	BOLT,BERANEK & NEW	7- 11	8 1/4	+ 3/8	+4.7
N	BUNKER-RAMO	5- 10	7	+ 1/2	+7.6
A	CALCOMP	4- 7	4 1/8	+ 1/8	+3.1
O	CAMBRIDGE MEMORIES	0- 6	1/2	+	+12.5
N	CENTRONICS DATA COMP	20- 36	26 1/8	-3 1/8	-10.6
O	CODEX CORP	22- 42	28	-3	-9.6
O	COGNITRONICS	1- 1	3/4	0	0.0
O	COMPUTER COMMUN.	1- 6	4 7/8	- 1/8	-2.5
O	COMPUTER CONSOLES	4- 7	3 3/4	- 3/4	-16.6
A	COMPUTER EQUIPMENT	1- 3	1 3/4	- 1/8	-6.6
O	COMPUTER TRANSCEIVER	1- 3	3/4	0	0.0
O	COMTEN	4- 9	7 1/4	+ 1/2	+7.4
N	CONRAC CORP	20- 25	21 7/8	+ 7/8	+4.1

EXCH		1976 RANGE (1)	CLOSE OCT 27 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	DATA ACCESS SYSTEMS	1- 5	4 1/2	0	0.0
O	DATA 100	7- 13	8 1/8	- 1/8	-1.5
A	DATA PRODUCTS CORP	5- 15	10 5/8	- 1/4	-2.2
O	DATA TECHNOLOGY	1- 2	1 3/8	+ 1/8	+10.0
O	DATUM INC	1- 2	1/2	- 3/8	-42.8
O	DECISION DATA COMPUT	1- 4	1 5/8	0	0.0
O	DELTA DATA SYSTEMS	1- 1	1/2	- 1/8	-20.0
N	ELECTRONIC M & M	1- 4	2 7/8	- 1/4	-8.0
O	FABRI-TEK	1- 1	7/8	+ 1/8	+16.6
O	GENERAL COMPUTER SYS	0- 2	3/8	- 1/8	-25.0
N	HAZELTINE CORP	4- 12	8 1/2	+ 3/8	+4.6
N	HARRIS CORP	34- 55	50 3/8	- 1/8	-0.2
A	INCOTERM CORP	9- 20	12 1/4	- 3/8	-2.9
O	INFOREX INC	3- 7	4 3/8	+ 1/4	+6.0
O	INFORMATION INTL INC	10- 18	12	0	0.0
O	INTEL CORP	53-109	54 1/2	-4 1/2	-7.6
A	LUNDY ELECTRONICS	3- 7	3 5/8	0	0.0
O	MSI DATA CORP	3- 7	5 7/8	0	0.0
A	MILGO ELECTRONICS	15- 21	18 1/8	+1 3/8	+8.2
N	MOHAWK DATA SCI	3- 10	5 3/4	- 1/2	-8.0
O	PENRIL CORP	1- 3	1 7/8	0	0.0
A	PERTEC CORP	3- 8	5 5/8	- 3/8	-6.2
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	3- 10	2	- 1/2	-20.0
O	QUANTOR CORP	4- 6	3 3/4	- 1/8	-3.2
O	RECOGNITION EQUIP	6- 11	8 1/4	+ 3/8	+4.7
N	SANDERS ASSOCIATES	6- 11	7 3/4	- 1/4	-3.1
O	SCAN DATA	1- 4	1 1/4	- 1/4	-16.6
O	STORAGE TECHNOLOGY	9- 13	9 3/4	- 1/4	-2.5
O	T BAR INC	5- 10	5 1/2	- 1/4	-4.3
O	TALLY CORP.	4- 6	3 7/8	0	0.0
O	TEC INC	3- 7	6 1/4	0	0.0
N	TEKTRONIX INC	45- 69	60 3/4	-1 5/8	-2.6
N	TELEX	2- 5	2 1/2	- 1/8	-4.7
O	WANGCO INC	11- 22	21 1/8	0	0.0
O	WILTEK INC	2- 2	1 3/4	+ 1/8	+7.6
	SUPPLIES & ACCESSORIES				
O	ADVANCED SYSTEMS INC	1- 4	3 3/8	0	0.0
O	BALTIMORE BUS FORMS	3- 5	3 5/8	0	0.0
A	BARRY WRIGHT	6- 10	8 3/4	0	0.0
O	CYBERMATICS INC	1- 1	1/2	0	0.0
A	DATA DOCUMENTS	25- 45	45 1/4	0	0.0
O	DUPLEX PRODUCTS INC	13- 24	13 1/4	- 1/8	-0.9
N	ENNIS BUS. FORMS	6- 8	5 1/2	- 1/8	-2.2
O	GRAHAM MAGNETICS	8- 13	9 1/2	- 1/2	-5.0
O	GRAPHIC CONTROLS	13- 19	16 1/4	+ 1/2	+3.1
N	3M COMPANY	53- 66	60 1/4	-1	-1.6
O	MOORE CORP LTD	32- 51	33	+ 1/4	+0.7
N	NASHUA CORP	11- 18	17 1/8	- 1/8	-0.7
O	STANDARD REGISTER	15- 19	17 1/4	- 1/4	-1.4
O	TAB PRODUCTS CO	5- 11	8 3/4	- 3/4	-7.8
N	UARCO	19- 25	19 1/4	- 3/4	-3.7
A	WABASH MAGNETICS	4- 9	8 3/4	- 1/4	-2.7
N	WALLACE BUS FORMS	19- 25	21 3/4	- 1/4	-1.1

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